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**IMPACT OF BUSINESS-TO-CONSUMER ELECTRONIC COMMERCE  
FACTORS ON FIRM PERFORMANCE IN TAIWAN'S  
E-BROKERAGE SECTOR**

**DISSERTATION**

**Presented in Partial Fulfillment of the Requirements for the Degree of**

**Doctor of Philosophy**

**Lynn University**

**By**

**May-Ching Ding**

**2007**

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**IMPACT OF BUSINESS-TO-CONSUMER ELECTRONIC COMMERCE  
FACTORS ON FIRM PERFORMANCE IN TAIWAN'S  
E-BROKERAGE SECTOR**

May-Ching Ding, Ph.D.

Lynn University, 2007

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## ACKNOWLEDGEMENTS

Coming back to the U.S. for my Ph.D was a tough decision. As an international student, I faced many challenges. The lifestyle, culture, and people are all so different, even though this is my second time being in the United States. Being alone was never an easy task for me to deal with. However, I am glad that I was eventually able to overcome all the difficulties. There are professors, friends, and family to thank. Without them, I could not possibly have gotten this far

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**IMPACT OF BUSINESS-TO-CONSUMER ELECTRONIC COMMERCE  
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**May-Ching Ding**

**Abstract**

The “new economy” influences the entire economy, from corporations and governments to society. Business-to-consumer (B2C) electronic commerce (EC) continues to grow despite the burst of the 2000 “e-bubble.” Dramatic changes in EC and the significance of EC’s impact on firm performance are important practical issues. Variations in firm performance (outcome variable) are attributed to organization effect and to industry effect. Thus, a theoretical framework that combines a strategic typology with a resource-based view of the dynamic capabilities perspective can explain the industry and organization effect on firm performance.

This non-experimental, correlational (explanatory) and causal-comparative (exploratory) survey and secondary data research design is the first to investigate the relationships among organizational characteristics (firm size and web age), CEO commitment to EC, strategy types, website design, and IT system integration capabilities on the performance of Taiwan’s e-brokerage firms. In this study, integrating factors of strategic types as an industry effect, CEO commitment to EC as a firm resource and website design and IT system integration as EC capabilities provided a better explanation of the performance of Taiwan’s e-brokerage firms.

Findings indicated that strategy types showed no significant differences on the level of firm performance (online sales and market share). Another finding suggested

that website design of catalog application and web age were significant contributors to the online annual sales growth rate. In addition, CEO commitment to EC, website design of catalog application, IT system integration capabilities, and web age were significant explanatory factors of the online annual market share growth rate.

Top managers of e-brokers in Taiwan must have the ability to do all things well in order to succeed in the rapidly-changing EC environment. EC firms can no longer benefit from first-mover advantage which contributes negatively to firm performance. At the same time, they need to emphasize and invest firm resources into EC and bundle and leverage EC (website design capabilities) as a way to create value for customers, build a sustainable competitive advantage, and gain superior performance over competitors.

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# **CHAPTER I**

## **INTRODUCTION**

### **Introduction and Background to the Problem**

In the new economy of the World Wide Web, the world is connected in a sophisticated manner that is made possible by innovative information and communication technologies. A digital revolution has transformed the way that most of us (with technology) learn, interact, communicate, and conduct businesses (Hoffman & Novak, 1996; Kehal & Singh, 2004). The Internet influences virtually everything in economics, corporations, governments and society at-large (Barua & Whinston, 2001; Kehal & Singh, 2004). The Web, as the World Wide Web is commonly known, has opened up a new space, cyberspace, and created a new way for companies to conduct transactions (Wang, Head, & Archer, 2002).

Despite the bursting of the 2000 “e-bubble,” business-to-consumer (B2C) electronic commerce (EC) online shopping has demonstrated continued growth (Braddock, 2001). Consumers, in particular the younger generation, are moving into a virtual world; thus, they are demanding more products and services online. This might explain why broadband users and online sales have surged. When the number of U.S. broadband users reached 49 million in 2005, EC experienced a 29% increase in growth (OECD, 2005). Retail e-commerce Christmas holiday sales rose to US\$22.9 billion, up 23% in the fourth quarter of 2005 from the fourth quarter of 2004 (U.S. Census Bureau, 2006). Forrester Research predicts that online shopping in the United States will enjoy an annual growth rate of 19% until 2008 (Rush, 2003).

Online sales growth can also be seen in countries other than the U.S. In Taiwan, the B2C EC market surged to \$1.1 billion (US), (NT\$ 34.72 billion), up 57.2% in 2004 (Find, 2005). Further, the market was predicted to triple to nearly \$ 3 billion (US), (NT\$ 95.22 billion), by 2008 (Find, 2005). Clearly, EC is expected to continue to grow and develop not only in U.S. but also in Taiwan.

EC provides unique advantages in breaking time and geographical boundaries for online businesses. EC allows companies to remain open 24 hours a day, seven days a week, and 365 days a year around the globe (wherever there is access to the Internet). Thus, businesses today are no longer constrained by time and location (Kahal & Singh, 2004; Wang, Head, & Archer, 2002). Consumers go online to access information that makes comparison shopping much more convenient. More importantly, the Internet has empowered consumers to become better informed and to request tailor-made products. As a result, consumers are more value-conscious than ever (Angel, 2004; Saeed, Grover & Hwang, 2005).

Because the EC discipline is relatively novel, most theories of valuating EC have evolved from economics and strategic management. Transaction costs and resource-based theories have been widely used to understand the relationships among B2C EC factors and firm performance (financial and market measures). Scholars have found that EC can minimize transaction costs for buyers and sellers in a market exchange and thus generate higher profits (Khan & Motiwalla, 2002; Liang, Lin, & Chen., 2004; Motiwalla, Khan, & Xu, 2005; Rotondaro, 2002). In addition, firms are likely to allocate resource strategically to create B2C EC capabilities that not only add value to customers but also enhance a firm's competitive advantage and operational and financial performance

(Barua, Konana, & Whinston, 2005; Barua, Konana, Whinston, & Yin, 2004; Colton, 2004; Ravichandran & Lertwongsatien, 2005; Saeed et al., 2005; Saini & Johnson, 2002; Zhu & Kraemer, 2002).

In spite of EC growth and advantages, 31.47% of online stores lost money in Taiwan (Institute for Information Industry, 2005). Researchers have found that EC has no influence on financial performance (Epstein, 2004; Kamssu, Reithel, & Zieglmayer, 2003; Motiwalla et al., 2005; Wang et al., 2002). Dynamic changes in EC have made online retailers struggle with the question of how to generate revenues (Wang et al., 2002).

What is the difference between those online stores who succeeded and those that failed? Is Internet technology the answer to online success? What distinguishes one online store from another in its ability to attract customers? Is a traditional business strategy also critical for success in EC? Porter (2001) pointed out that "it is more important than ever for companies to distinguish themselves through strategy" (p. 63) and the winners will be those that leverage the Internet to assist what a firm is doing the best, the competitive advantage. The Internet can complement and enhance value by integrating information technology to the value chain, "the set of activities through which a product or service is created and delivered to customers" (Porter, 2001, p. 74).

Miles and Snow's (1978) and Porter's (1980) strategy frameworks have been adopted and tested in the EC context. EC researchers found that traditional strategy types are applicable to the EC (Kim, Nam, & Stimpert, 2004; Saini & Johnson, 2002). The higher the level of information technology (IT) integration capabilities, the greater the enhancement of a firm's financial performance (Barua et al., 2004; Ravichandran &

Lertwongsatien, 2005; Zhu & Kraemer, 2002). In addition, a significant positive relationship between website design and firm performance based on concepts of website interactivity and usability and EC capabilities have been found (Auger, 2005; Lee & Kim, 2002; Ranganathan & Grandon, 2002; Zhu & Kraemer, 2002).

The causal (independent) variables in this study were B2C EC factors, which include website design and IT system integration capabilities, CEO commitment, and strategy types. The outcome (dependent) variable was firm performance, which indicated by online sales and market share.

Financial and market measures are used as performance indicators. Sales growth rate and profitability are widely applied financial measures (Auger, 2005; Garbi, 2002; Motiwalla et al., 2005; Rajgopal, Venkatachalam, & Kotha, 2001; Saini & Johnson, 2005). In contrast, market share, although not widely used, has been applied in research on e-brokerage firms (Saini & Johnson, 2005). In addition, widely used perceptual indicators for EC are page views and unique visitors (Garbi, 2002; Hand, 2000; Saini & Johnson, 2005; Trueman, Wong, & Zhang, 2000). However, the extraordinary dynamism and volatility of EC have complicated the valuation of B2C online stores, partly because of the lack of consistent, historical financial data (Epstein, 2004; Garbi, 2002; Wang et al., 2002; Yang, Kwon, Rho, & Ha, 2003).

In this study, measures of financial performance of Taiwan e-brokerage firms included annual online sales made through online stock trading sites and online market share as appropriate and obtainable financial measures for Taiwan's e-brokerage firms (Lee & Kim, 2002; Saini & Johnson, 2005). Two contextual variables were used to understand the link between B2C EC and firm performance. Firm size is often used in



the strategic management field (Aragon-Sanchez & Sanchez-Marin, 2005; Auger, 2005; Saeed et al., 2005; Saini & Johnson, 2002), and Web age (in terms of years using EC) has been employed in EC studies. Thus, these two were the contextual variables in this study.

Most empirical studies have investigated chief executive officer (CEO) commitment, strategy types, website design, and IT system integration capabilities separately in relation to firm performance. Findings suggest that those B2C EC factors have a positive impact on firm performance, but no single study has incorporated both the strategy types and EC capabilities (website design and IT system integration) that may be critical to the success of B2C EC firms. Scholars have suggested that CEO commitment may also be crucial to website success (Epstein, 2005; Huizingh, 2002; Kuo, 2003; Lee, 1999; Yang, Chen, & Chen, 2002; Zhuang & Lederer, 2004). However, only some theoretical literature and a few empirical studies have examined the effect of CEO commitment on B2C EC firm performance. Therefore, this study integrated the four variables to understand their impact on firm performance.

This study was conducted on Taiwan's online brokerage sector. Most of Taiwan's EC literature is limited to business models that have played an influential role on firm performance (Chang, 2004; Cheng, 2001; Lu, 2004) although some have examined the development of the online securities sector (Chang, Huang, & Ging, 2000; Chen, 2001). Only a few research studies explored the area of B2C EC factors on firm performance of Taiwan's brokerage firms.

### **Purpose of the Study**

Studies have separately investigated the impacts of CEO commitment, website design, IT system integration capabilities, and strategy types on firm performance. For a

B2C EC firm to be successful, all four factors should be addressed. The primary purpose of this non-experimental, causal-comparative, and correlational (explanatory) study was to explain the relationship between B2C EC factors and financial (market) performance of firms in Taiwan's online brokerage sector. Thus, this study was to:

1. Investigate whether different strategy types resulted in different levels of firm performance for Taiwan's e-brokers.
2. Examine the influence of B2C factors, CEO commitment, strategy types, website design, and IT system integration capabilities on the performance of Taiwan's e-brokerage firms.

This research is believed to extend the body of knowledge on financial performance in the field of B2C EC. Knowing the impact of B2C EC factors on financial performance can assist organizations to understand the new economy in order to use EC to gain and sustain the competitive advantage that will allow them to reach their economic (or market) goals.

### **Definitions of Terms**

Although there is no single and universally accepted definition of EC (Colecchia, 1997; Hasan & Tibbits, 2000; Holsapple & Singh, 2000; Wong & Lam, 2002), it has been defined as "the process of buying, selling, or exchanging products, services, and information via computer networks, including the Internet" (Turban, King, Lee, & Viehland, 2004, p. 3). Business-to-Consumer (B2C) EC is the transaction that is conducted between business and customer via electronic techniques (Zhu, Ho, Tang, & Chen, 2003).

### ***Independent Variables***

Five independent variables were investigated in this study. Their theoretical and operational definitions are defined below.

#### ***Top Managers***

***Theoretical definition.*** Top managers have the authority to lead and set strategic directions for organizations and “work toward the organization’s goals using its resources in an effective and efficient manner” (McNamara, 1999, p. 3).

***Operational definition.*** In this study, top managers consisted of department heads and assistant managers that are one and two levels down from the CEOs. Top managers’ gender, age, education, and tenure were measured.

#### ***Strategic Typology***

***Theoretical definition.*** Miles and Snow (1978) defined strategy as a pattern of an organization’s critical decisions and actions. Further, Miles and Snow identified a typology that consists of four strategy types: prospectors, defenders, analyzers, and reactors. Different strategy types have different responses toward the external environment.

According to Miles and Snow (1978), prospectors constantly search for market opportunities. Prospectors are usually the first to respond to emerging markets and thus they create the change (set the tone) that their competitors can only follow. In contrast, defenders serve in a narrow product-market environment and focus on improving operational efficiency. Analyzers prefer a mixed (hybrid) strategy that balances defenders and prospectors in the interests of operational efficiency and effective response

to environmental changes. Finally, reactors do little more than respond to environmental changes.

**Operational definition.** The four strategy types were measured by four self-typing descriptive paragraphs to represent the strategy types (categorical variables) developed by Snow and Hrebiniak (1980).

#### ***CEO Commitment to EC***

**Theoretical definition.** CEO commitment to EC is the willingness if not the passion to invest resources in EC (Zhuang & Lederer, 2004).

**Operational definition.** In this study, CEO commitment to EC was measured by the commitment of CEOs, investing resources (time and funds) to EC and expressing the importance of EC. This CEO commitment to EC questionnaire was developed by Powell and Dent-Micallef (1997) and further revised by Zhuang and Lederer (2004) to be used in an EC context.

#### ***EC Capabilities: Website Design***

**Theoretical definition.** A comprehensive website design that incorporates the features Internet technology uses to create website capabilities is defined as EC capabilities (Zhu & Kraemer, 2002; Zhuang & Lederer, 2004).

**Operational definition.** In this study, website design has six dimensions which will be measured by an 18-item questionnaire developed by Zhuang and Lederer (2004). One item was added by the researcher to understand which site features were perceived as the most important. These dimensions were operationally defined as follows:

1. Interactivity refers to a site's user-friendliness (ease of use).

2. Transaction application allows online customers to conduct transactions with security and to track their order.
3. Catalog application provides information about products and services.
4. Interface (customization) refers to ease of navigation and the tailoring of information to meet the needs of each user.
5. Publishing application provides company policy and the information needed to create customer trust.
6. Server performance refers to a site's download speed and the frequency of system crashes.

#### ***EC Capabilities: IT System Integration***

***Theoretical definition.*** Barua, Konana, Whinston, and Yin (2004) defined system integration as the ability of a firm to integrate its information technology systems to allow online information sharing and transaction execution across the value chain.

***Operational definition.*** In this study, system integration consisted of three different IT systems: enterprise resource planning (ERP), supply chain management (SCM), and customer relationship management (CRM). The construct was measured by an item questionnaire, developed by the researcher.

#### ***Dependent Variable: Firm Performance***

##### ***Theoretical Definition***

Firm performance is defined as that which “compares the value that an organization creates using its productive assets with the value that the owners of these assets expect to obtain” (Garbi, 2002, p. 3). An online sale is the amount of the transactions that complete an online securities order (online sales of financial products)

between sellers and buyers and e-brokers (Trading Department of Taiwan Stock Exchange [TDOTSE], 2006). Online market share is the percentage of sales that a firm has of the total market sales (TDOTSE, 2006).

### ***Operational Definition***

In this study, firm performance was the combination of online sales and online market share. Firm performance was measured by two financial indicators. Annual growth rates of online sales and market shares were measured.

### ***Contextual Variables***

#### ***Firm Size***

***Theoretical definition.*** The size of a firm indicates its level of operational resources (Auger, 2005).

***Operational definition.*** In this study, firm size was measured by logarithm of the number of employees (Auger, 2005; Saeed et al., 2005).

#### ***Web Age***

***Theoretical definition.*** Web age refers to the number of years that B2C EC online firms have been in operation (Saini & Johnson, 2002).

***Operational definition.*** In this study, a firm's Web age was measured in months.

### ***Justification***

The justification of the study was its significance and the extent to which this topic was researchable and feasible. The contribution of the study was in the knowledge of B2C EC's impacts on brokerage firms. To date, no single study has integrated the factors of CEO commitment to EC, strategy type, website design and IT system integration capabilities to explain firm performance. As a result, the findings of this

study added useful insights that EC managers may use to make informed decisions about their firms' economic (or market) goals.

This study was researchable because of its scientific questions and quantifiable research variables. The research was feasible because the underlying concepts of the theoretical framework were assessable, the amount of time needed to complete the study was adequate, and participants were available. In addition, all of the variables in the study were able to be analyzed by statistical methods, such as descriptive analysis, correlation, analysis of variance (ANOVA), and hierarchical multiple linear regression. This study followed all of the necessary procedures to ensure the protection of the rights of human subjects.

The relationship between certain B2C EC attributes and firm performance was chosen for this study because B2C EC has gained practical and strategic importance in the realization of sustainable competitive advantage and the ability to meet corporate objectives (Barua et al., 2005; Barua et al., 2004; Colton, 2004; Saeed et al., 2005; Saini & Johnson, 2002; Zhu & Kraemer, 2002). The constant search for growth and survival is the driver for corporations, especially for B2C EC companies. In addition, the current investigation of this topic was encouraged by a personal interest in and experience with finance and online shopping.

### **Delimitation and Scope**

This study had the following delimitations:

1. This study was restricted to B2C EC; thus, other forms of EC, such as business-to-business (B2B), consumer-to-consumer (C2C),

government-to-business (G2B), and government-to-consumer (G2C) or combinations of those were excluded.

2. The geographic setting was confined to Taiwan, minimizing the influences of extraneous variables such as diverse cultures, economies, and politics.
3. The target population was restricted to online securities brokers who provide full-function online transactions and report their transaction data to the Taiwan Stock exchange (for data consistency).
4. Participants were top managers who work in online securities firms, have contact with CEO's and are knowledgeable about the CEO's commitment to EC, corporate strategy, website features, and IT system integration capabilities.
5. The survey participants were limited to those able to speak, read, and write Mandarin.

Chapter I provided an overview of the study. The background and purpose of the problem, definition of variables, justification, and delimitation were provided.

Chapter II provides an in-depth literature review of B2C EC attributes on firm performance. A critical analysis of theoretical and empirical literature about CEO commitment, strategy types, website design, IT system integration capability, and firm performance will be presented. The theoretical framework (research model) was derived from the literature gap, and led to the propositions and hypotheses presented at the end of the chapter. Research question and hypotheses are the third and fourth sections of chapter II.



Chapter III presents the research methodology, consisting of the research design, population, sampling, survey instruments, data analysis procedures, ethical considerations, methods of data analysis, and finally the evaluation of the research methodology.

Chapter IV describes the findings of the study including the results of hypotheses testing, while Chapter V presents the interpretations of those results. Chapter V also includes conclusions related to the study, along with their implications and limitations, and suggestions for future research.

## **CHAPTER II**

### **REVIEW OF LITERATURE, THEORETICAL FRAMEWORK, RESEARCH QUESTION, AND HYPOTHESES**

#### **Review of Literature**

Chapter II reviews and analyzes the theoretical and empirical literature to explore the impact of B2C EC factors on firm performance and identify future areas of scholarly inquiry. A review of the theoretical and empirical literature found that the impact of B2C EC factors on firm performance was generally positive correlated. However, certain inconsistencies were caused by the different methodological methods used to measure the variables. A literature gap was found and recommendations for future inquiry were made for this research proposal on the basis of that gap. Consequently, a theoretical framework for this study was developed first. Second, hypotheses were derived and tested. The following section reviewed the dependent and independent variables.

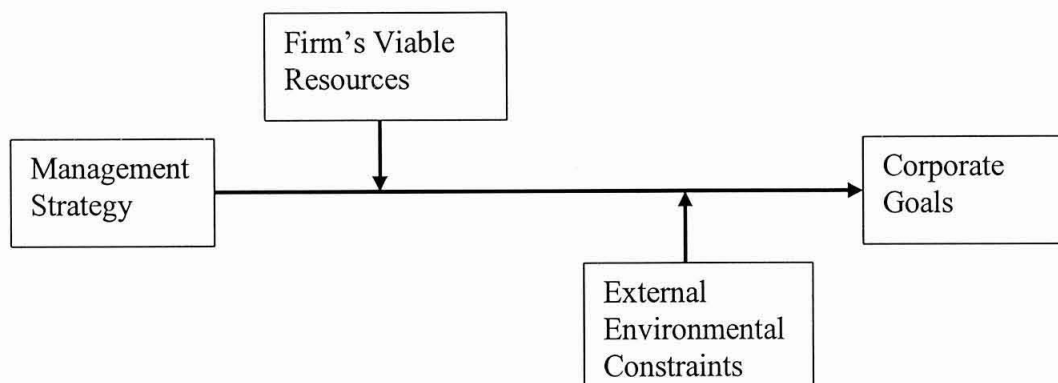
#### ***Firm Performance***

Firm performance is the outcome variable that measures the financial health (or wealth) of corporations. Garbi (2002) defined firm performance as “compares the value that an organization creates using its productive assets with the value that the owners of these assets expect to obtain” (p. 3). From this definition, a firm’s performance depends on the ability to use productive assets to generate expected returns. EC firm performance is measured using both perceptual and financial terms. Overall, measuring organizational

performance is vital in order for B2C EC firms to assess their past and present performance and use this information to improve their future performance.

### ***Schendel and Patton's Financial Model***

Wild (1993) stated that the popularity of applying financial models to better understand a firm's financial performance has steadily grown since the 1970s because the financial model is essential for strategic management. "The financial model of the firm is a useful tool for corporate management in formulating and executing strategic company operations and in understanding past managerial actions" (Schendel & Patton, 1978, p. 83). Schendel and Patton (1978) argued that three components are related to strategic decisions: "(1) the goals of the firm, (2) the available means or resource allocations, and (3) the environmental constraints." (p. 83). The first two components are internal variables that can be controlled by management, but the third component is an external variable, which is not under management's control. These components are depicted in Figure 2-1 based on the narrative work of Schendel and Patton (1978).



*Figure 2-1.* Researcher's schematic model based on narrative description of Schendel and Patton's financial model (1978).

Capon, Farley, and Hoening (1990) claimed that “business financial performance is in the form of measures of individual relationships in models linking various hypothesized causal variables to various performance measures” (p. 1143). Those causal variables range from a firm’s internal and external environment, to manager’s strategy, and organizational characteristics (Capon et al., 1990). As a result, financial models have applied in the disciplines of economics, management, marketing, business policy, accounting, finance, international business, psychology, and sociology.

#### ***A Financial Performance Evaluation Model***

Since EC is in its early stage of development, there is limited research on performance measures for B2C (both “pure players” and “click and mortar”) companies. However, Motiwalla, Khan, and Xu (2005) were the first to integrate operational performance with financial profitability and growth measure, thus creating a financial performance model for EC companies (business-to-business [B2B], B2C, and consumer-to-consumer [C2C]). In their model, net income/sales, inventory/cost of goods sold, operating costs/sales, gross profit/net sales, current ratio, and inventory turnover are measures of the internal operational efficiency of the electronic process. In addition, profitability and growth ratios measure the external market growth of e-companies. The combined measure of internal and external efficiency is believed to capture the financial performance of EC firms.

#### ***Measurements of Firm Performance***

Measurements of firm performance are not consistent over time. For the “new economy,” several perceptual and financial measures have been investigated to understand B2C EC. As a result, there are various EC specific indicators used to measure

firm performance. In addition, traditional financial ratios analyses are also used as “ways of comparing and investigating the relationships between different pieces of financial information” (Ross, Westerfield, & Jordan, 2001).

**Financial measures.** Multiple financial indicators have been applied in EC measurement. First, financial measures of sales growth rate and profitability were outcome variables to investigate the impact of CEO commitment (Zhuang & Lederer, 2004). Similarly, sales amount, sales growth rate, profitability, profit margin, ROA, and ROE were utilized to determine the impact of EC strategies (Kim et al., 2004; Lai & Wong, 2005; Saini & Johnson, 2002). Third, financial measures, such as sales growth rate, profitability, total transaction volume, and online sales, were utilized to assess website design features’ impact. Fourth, other financial ratios, such as market share, earning per share (EPS), return on equity (ROE), return on asset (ROA), market value (share value), sales (revenues), Tobin’s q, ROI (return on investment), were applied to measure the impact of EC business models, industry characteristics, EC capabilities, EC critical success factors, and Web traffic (Garbi, 2002; Graham, Cannice, & Sayre, 2002; Motiwalla et al., 2005; Liang et al., 2004; Lu, 2004; Rajgopal, Venkatachalam, & Kotha, 2001; Saeed, Grover, & Hwang, 2005; Sanini & Johnson, 2005; Yang et al., 2003). Among financial measures, sales growth rate and profitability were the two most widely used measures used by EC scholars.

**Perceptual measures.** Perceptual measures that use the computer to access and view information on the Internet are specific for B2C EC. Therefore, measuring Web presence and traffic is important (Garbi, 2002). EC Web traffic measures, such as page views (a Web page is loaded to a computer), unique visitors (new visitors to a website

only counted once), reach (the percentage of unique visitors over total population viewing the Web), stickiness (recurring visitors for a particular website), click-through rate (one website to another through a link), conversation rate (a ratio of pages viewed to actual buying), and buy rate (a ratio of actual buyers over total visitors), were utilized by scholars (Auger, 2005; Garbi, 2002; Graham et al., 2002; Kim et al., 2004; Rajgopal et al., 2001; Yang et al., 2003).

Kaplan and Norton (1992) developed the balanced scorecard to complement traditional financial measures. The balanced scorecard categorizes measures according to financial performance, customer relations, internal business processes, and organizational learning and growth. Within the financial performance category, return on sales (ROS), sales growth, ROA, and net income are used as measures. Further, Kaplan, and Norton (1996) incorporated the balanced scorecard with a range of business objectives into a strategic management system. The balanced scorecard can measure performance and strategic management (Hasan & Tibbits, 2000; Henri, 2004; Lipe & Salterio, 2000). Hasan and Tibbits (2000) suggested adopting the balanced scorecard on EC firms as a strategic management tool.

Researchers have attempted to understand the EC initiatives that have affected firm performance. As EC is a new field of study, many financial and perpetual measures have been explored. However, the literature review found that no specific firm performance measures have been accepted by researchers. Future study should focus on validating current measures and exploring better firm performance indicators.

### ***Other Firm Performance Indicators***

Garbi (2002) conducted a quantitative study exploring indicators as predictors of firm performance by comparing e-companies and “brick and mortar” firms. A random sampling plan included 60 companies, 30 e-companies and 30 traditional companies. The financial measures used included asset productivity, shareholder value, growth, survival, and EC specific indicators, such as page view and unique visitors. Among the e-companies, a further grouping into survivors and non-survivors at the time of “e-bubble” was also conducted. The differences in measures between the non-EC and EC firms were compared to determine which measures better predicted firm performance.

Inferential statistical analyses used to examine firm performance between EC and traditional companies were one-way ANOVA, *t*-test and Pearson’s correlation. Comparison of the two groups showed no significant differences except in the rate of unique visitors and the asset sizes in the 1999 data according to ANOVA. Market value showed statistical significance between the two groups in 1999, while no significance was found in 2000. This inconsistency may be a result of over-valuation of EC firms in 1999. In addition, correlations indicated that market value, net income growth, employee growth, age of the firm, and size in assets were significantly correlated with the rate of unique visitors. However, market value was significant negatively correlated to ROE and ROA. EC firms showed a highly positive correlation “between revenues growth and cost and expenses growth and between revenues growth and employees growth” (Garbi, 2002, p. 9). Overall, multiple indicators were necessary to capture EC firm performance.

Strengths of the study included an adequate literature review, random sampling, and clearly defined procedures indicating good internal validity. Conversely, the

conceptual framework and hypothesis development were not presented, an indication of weakness in internal validity. Nonetheless, external validity of the study could be generalized, but is limited to the scope of the study.

Suggestions for future research include conducting studies with “click and mortar” firms in the future as this type of e-company is growing in importance. In addition, a larger sample size should be considered and financial and non-financial indicators need further validation in other industries. Finally, other financial measures and EC specific measures should be tested.

Graham, Cannice, and Sayre (2002) completed a quantitative study for the purpose of finding the value relevance of financial and non-financial measures to predict EC firms’ stock price. A non-probability sampling plan resulted in the self-selected, data producing sample of 111 EC companies grouped into e-tailers, content/community, services, and infrastructure. Independent variables were grouped into two measures; financial measures which included net income and book value, and non-financial measures comprised of unique users, page views, and hours per user (stickiness). The dependent variable measured was stock price.

Regression models were used for data analysis. Financial measures, especially net income, failed to predict stock prices of Internet firms. This finding was in contrast with Yang et al. (2003). Book value revealed a modest and significant effect on market value for e-tailers and content/community companies. Among the perceptual measures, both the unique users and page views were statistically significant for market value. On the other hand, hours spent on a website had no significance in predicting market value. However, results revealed that service companies were significantly impacted by unique



users. No financial and non-financial measures were able to explain market value for infrastructure companies.

The strengths of the study were a thorough literature review that derived valuation equations presented by regression models. In addition, the procedures of conducting empirical testing were clearly defined, allowing for future replication. However, internal validity was not satisfactory due to the lack of theory and hypothesis foundation. In addition, sample selection was not random, and external validity was not obtained.

Follow-up research may evaluate important predictors for EC success using current market valuations after the speculative bubble in 2000. Future research could explore the factors that contributed to EC firms that have or have not survived. Finally, use of other financial measures such as economic valued added (EVA) may better explain a firm's market value.

The literature review of alternative measures for EC firms pointed to different results that depended upon the methodologies that were executed. However, these two studies tested some other EC specific indicators to predict firm performance. Future research should also concentrate on validating those measures and trying to find better measures of firm performance.

### ***Business-to-Consumer Electronic Commerce***

“Theory has not been free or quick enough to deal with the blur of e-commerce and networked, open system” (Speaks, 2000, p. 74). As a result, B2C EC theories have been embraced by the economics and strategic management fields. From an economic fundamental view, the web-based economic model is more efficient at the transaction cost level (Bodily & Venkataraman, 2004; Khan & Motiwalla, 2002; Motivalla et al.,

2005). Resource-based theory presents a contingency model that enhances a firm's abilities to coordinate and exploit its resources and creates online informational capabilities, which then lead to improved operational and financial performance (Barua et al., 2004; Mahmood & Szewczak, 1998). However, EC is defined as "the process of buying, selling, or exchanging products, services, and information via computer networks, including the Internet" (Turban, King, Lee, & Viehland, 2004, p. 3). Hence, the definition of B2C EC includes to "improve the transaction between business and customer with electronic techniques" (Zhu et al., 2003, p 25). Referring from the B2C definition, B2B can be said to improve the supply chain management between business and supplier with electronic techniques.

### ***Theory of Transaction Costs Economics***

Coase (1937) and Williamson (1979) pioneered the theory of transaction costs and stated that a firm will expand to a point at which the cost of operating an extra transaction equals the costs of making the same transaction in an exchange of the open market system. Transaction costs include searching, negotiating, monitoring and enforcement costs during a market exchange (Bakos, 1997; De, Mathew, & Abraham, 2001; Lee, 2001). Further, Mahadevan (2000) saw Internet-based business as value streams that reduce product search and transaction costs while improving the shopping experience.

The criticism of the theory is that there is no consistency in transaction costs terminology. Moreover, EC is a relatively new discipline in economic science (Kehal & Singh, 2004). However, scholars researching transaction costs theory believe that the Internet increases the efficiency of the transaction process (Lee & Kim, 2002; Liang et al.,

2004). As a result, this theory has persuaded scholars to explore the benefit of EC as a new way to achieve better corporate performance.

The theory proposes that EC can minimize transaction costs that in turn increase firm performance. The method of induction is used in theory building and there is no schematic model to depict the relationship between transaction costs and firm performance. However, the theory is relatively simple and can be applied in the disciplines of economics, management, marketing, finance, and EC. A major competing theory for EC is the resource-based view of the firm.

### ***Theories of Strategy***

Strategy theories developed in the late 1970s and 1980s in the strategic management field. Generic strategies advanced by Miles and Snow (1978) and Porter (1980) are representative of the work in the field in that period. During the 1990s, a resource-based view dominated the field and further evolved into a dynamic capabilities perspective.

Strategies were not tested in B2C EC until recently. Scholars assumed that traditional strategies would also be applicable in the “New Economy.” Two strategic typologies developed by Miles and Snow (1978) and Porter (1980) are the most representative in the strategic management field (Gibbons, Kennealy, & Lavin, 2003; Grover & Saeed, 2004; Kim et al., 2004; Parnell & Hershey, 2005). The results supported the belief that traditional strategy types can be useful and influential on firm performance in a virtual world (Kim et al., 2004; Saini & Johnson, 2002).

Parnell and Hershey (2005) stated that scholars were aware of their inability to elucidate performance variances within an industry. Hence, strategic group refers to

“groups of organizations that exhibit patterns of consistency in strategic orientation” (Grover & Saeed, 2004, p. 25). Both Miles and Snow’s (1978) and Porter’s (1980) typologies are based on the belief that strategic processes can be simplified by seeking patterns of organizational behaviors. As strategic groups help identify clusters of businesses with similar strategies, scholars have utilized strategy typologies as a theoretical basis to categorize and examine strategic groups in relation to firm performance in traditional firms (Aragon-Sanchez & Sanchez-Martin, 2005; Garrigos-Smith, Marques, & Narangajavana, 2005; Gibbons et al., 2003; Matsuno & Mentzer, 2000; Parnell & Hershey, 2005; Parnell & Wright, 1993) and in EC firms (Grover & Saeed, 2004; Kim et al., 2004; Saini & Johnson, 2002).

*Miles and Snow’s typology.* Strategic group theory analyzes the competitive structure of industries (Barney & Hoskisson, 1990). Miles and Snow (1978) offer a theoretical framework, an integrated dynamic system that interrelates organizational strategy, structure, and process and aligns with an organization’s environment. Adaptive cycle is the process in which organizations continually adjust to environmental changes in dealing with and solving entrepreneurial, engineering, and administrative problems. First, an entrepreneurial problem centers on how managers define and commit resources into their organizational domain in specific products and services (a target market). Second, an engineering problem can be solved by creating a system in which managers choose a technology to produce and distribute the organization’s products and services. Such a system can further integrate information, communication, and control for internal operations. Third, an administrative problem deals primarily in reducing uncertainty by

rationalizing, formulating, and implementing the system that enables an organization to innovate.

“When competing organizations within a single industry are observed; however, patterns of behavior begin to emerge which suggest that these various organizational forms can be reduced to several archetypes” (Miles & Snow, 1978, p. 29). Thus, Miles and Snow (1978) identify four types: the defender, the reactor, the analyzer, and the prospector. Each type has its own strategy coordinating with their organization’s technology, structure, and process and responding to the environment.

First, defenders serve in a narrow product-market environment and focus on improving operational efficiency. As a result, defenders rarely change their strategy, structure, technology, and operation in their environment. Second, prospectors are the opposite of defenders. They are constantly in search of market opportunities and usually the first to respond to an emerging market. Consequently, prospectors are the creators of change that competitors can only follow and prospectors are not efficiency centered. Third, analyzers try to balance defenders (stable market) and prospector (changing market). Thus, they are after both operational efficiency and rapid responses to competitors. Fourth, reactors are unable to respond effectively to environmental changes. They make changes in their strategy and structure only because they are forced to do so by environmental pressures (Miles & Snow, 1978).

This theoretical framework proposes that prospectors, analyzers, and defenders are likely to outperform reactors. Various empirical studies tested Miles and Snow’s (1978) typology and provided reliability and validity support for the typology in traditional organizations. Studies found significant differences among prospectors,

defenders, and analyzers and these strategy types outperformed reactors who had the worst firm performance in traditional markets (Aragon-Sanchez & Sanchez-Martin, 2005; Garrigos-Smith et al., 2005; Gibbons et al., 2003) and a similar result was also found in EC firms (Saini & Johnson, 2002). Another study found that strategy typology mediated the relationship between market orientation and business performance (Matsuno & Mentzer, 2000).

However, some studies eliminated reactors for a variety of reasons. As stated by Matsuno and Mentzer (2000), reactors have inconsistent objectives and behaviors. Thus, this type of strategy is recognized as an unviable strategy for organizations. In addition, managers are unlikely to pursue this strategy type. As a result, various empirical studies also excluded reactors (Apigian, Ragu-Nathan, & Ragu-Nathan, 2003; Aragon-Sanchez & Sanchez-Martin, 2005; Garrigos-Smith et al., 2005; Matsuno & Mentzer, 2000).

Limited studies utilized Miles and Snow's typology (1978) to test strategy and performance relationship in EC firms (Auger, 2003; Saini & Johnson, 2002). This indicates the need for future study in this area as this strategy might be a crucial factor that determines firm performance. Scholars should try to find whether or not strategies generally explored in traditional markets can also be applicable to EC.

**Porter's generic strategy.** Porter (1980) argued that the profitability of firms is determined by two major factors. First, how lucrative an industry a company is in and second, how a company is positioned in relation to its competitors in the industry. Further, Porter stressed that a firm should leverage its strengths to position itself in an industry. Strengths can ultimately derive from either cost advantage or differentiation.

Incorporating a broad or narrow scope, four archetypes, cost leadership, differentiation, focus-cost leadership, and focus-differentiation, were developed.

Characteristics of the four strategy types distinguish one from another. First, a firm utilizing a cost leadership strategy wants to be the low cost provider in its industry. A low cost provider must exploit factors such as economies of scale, exclusive access to raw materials, or proprietary technology in order to sustain cost leadership in its industry. As a result, the firm can obtain an above average return compared to its competitors. Second, differentiation is all about uniqueness that is valued by buyers. As a result, differentiators can charge premium prices on its products and services. Third, a firm selecting focus-cost leadership searches for cost advantage in some segments. Finally, a focus-differentiator aims at exploiting special needs of certain buyers in specific segments.

Porter (1980) perceived that using one of these generic strategies is likely to provide a competitive advantage. However, firms considering mixed or hybrid strategies are likely to have poorer performance. Thus, Porter's generic strategy proposed that a mixed or hybrid strategy (stuck-in-the-middle) is likely to result in inferior performance.

Findings of recent empirical studies contradicted Porter's (1980) proposition as a combined hybrid strategy (stuck-in-the-middle) performed better than any generic strategy (Hlavacka, Bacharova, Rusnakova, & Wagner, 2001; Marlin & Huonker, 2004; Spanos, Zaralis, & Lioukas, 2004). However, two studies confirmed Porter's proposition that, in general, generic strategies resulted in higher performance (Kumar, Subramanian, & Yauger, 1997; O'Farrell, Hitchens, & Moffat, 1993). In addition, one study found that cost leadership performed better than other generic strategies in the U.S. banking industry

(Powers & Hahn, 2004), and another found significant differences among Porter's generic strategies on performance in India (Gopalakrishna & Subramanian, 1998).

Interestingly, one study examined Porter's (1980) generic strategies on B2C EC firm performance and found a hybrid cost leadership-differentiation strategy had the highest performance and a cost leadership strategy showed the lowest performance (Kim et al., 2004).

Critiques of the two strategic groups have largely been focused on their lack of consideration of the unique idiosyncratic resources at the individual firm level (Barney & Hoskisson, 1990). Similarly, Porter's (1980) generic strategy was criticized for its emphasis on industry structure to determine firm performance (Fahy & Smithee, 1999). In addition, scholars argued that the simplified archetypes might not be representative of all strategic types and might only explain those strategies that had simply been perceived, but not yet realized (Snow & Hambrick, 1980). As a result, strategists have moved their attention to address firm-level resources, such as the resource-based view (RBV). Both generic strategic groups proposed that a generic strategy is usually associated with superior performance. However, empirical studies found that a mixed strategy outperformed pure strategies (Hlavacka et al., 2001; Kim et al., 2004; Marlin & Huonker, 2004; Spanos et al., 2004). This contradiction has led to the current debate regarding combination strategies.

*The combination debate.* Empirical studies have found that a combination strategy performs better financially (Hlavacka et al., 2001; Kim et al., 2004; Marlin & Huonker, 2004; Spanos et al., 2004). Some scholars also believe that the combination strategy is viable over the long term and provides superior performance (Parnell, 2000;



Parnell & Hershey, 2005). In contrast, supporters of the generic strategies concept point of view see the different strategy types as mutually exclusive.

Interestingly, Parnell (2002) reconceptualized a business strategy typology using a resource-based view to address the "New Economy." Due to the rise of the Internet, strategic management process must meet the serious challenges of dramatic shifts in organizational structure and viable business models. The author identified five Internet characteristics that are closely related to the strategic management process.

First, information asymmetry is broken by the Internet. The Internet enables all parties to a transaction to share the same information (Porter, 2001). Second, the Internet can be used as a distribution channel for goods and services. Third, the Internet allows customers and businesses to speed up the processes of the actual transaction. Fourth, the Internet makes interactivity possible for all parties (between and across consumers, suppliers, and firms, for example). Fifth, the Internet offers opportunities for online firms to minimize their costs and thus increase flexibility (Mahadevan, 2000; Porter, 2001).

As a result of digital advances, Parnell (2002) proposed a modified competitive strategy typology to integrate the traditional economy and the "New Economy." Using that concept, Parnell (2002) reconceptualized and synthesized the strategic typology and the resource-based view into a refined business strategy framework that would apply to the "New Economy." This refined business strategy framework identified four means of obtaining competitive advantage for four strategy types. First, organizational resources of the culture of change, speed, technological leadership, marketing expertise, effective product, and research and development (R&D) create the competitive advantage of product innovation. This aspect is identified as prospectors (from Miles and Snow) and

differentiators (from Porter). Second, organizational resources, such as the culture of flexibility, marketing expertise, speed, and technological ability provide a competitive advantage of structural innovation. This aspect is believed to be the analyzer strategy (from Miles and Snow). Third, organizational resources from the culture of efficiency, market segment expertise, effective process, and R&D generate a competitive advantage of process innovation. This aspect coincides with the strategy types of defenders (from Miles and Snow) and focus-cost leadership (from Porter). Fourth, organizational resources coming from a cultural blend of change, flexibility, efficiency, speed, technological leadership, and marketing expertise create a competitive advantage of synergistic innovation. This strategy type is defined as a combination strategy. One study integrated the strategy types of Porter (1980) and those of Miles and Snow (1978) to focus on the nature of a combined strategy (two or more pure strategies). Scholars found that a combined strategy can either produce inferior or superior firm performance (Parnell & Hershey, 2005).

Both generic strategy types provide a theoretical framework in investigating relationships between strategy types and firm performance. However, an investigation of such relationship in EC firms is extremely scarce. According to the empirical studies on EC firms, generic strategy types utilized in traditional markets can be useful in understanding relationships between EC firm strategy and firm performance (Kim et al., 2004; Saini & Johnson, 2002).

***A resource-based view of the firm.*** Penrose (1959) contributed to the resource-based view of the firm by arguing that a firm is more than an administrative function; it is a collection of productive (both physical and human) resources that are determined by

managerial decisions on how to use productive resources as a means of pursuing a firm's profit and growth. Wernerfelt (1984) explored the concept of resource position barrier to be used as a strategic means; however, the theory was not clearly explained. However, scholars did consider that Barney (1991) provided a complete idea of the modern resource-based view of the firm (RBV). Barney built on the prior assumptions that strategic resources are heterogeneous and immobile among firms in an industry (or group) and that the unique assets and capabilities of some firms allow those firms to sustain competitive advantage. As a result, the RBV accentuates strategic choices by a firm's top management to identify, develop (or create), and deploy a firm's unique resources to maximize and attain above average returns.

Barney (1991) went further to discuss the difference between competitive advantage and sustained competitive advantage. A competitive advantage occurs when a value creating strategy is implemented by an individual firm and this strategy is not employed by any current or potential competitors of the firm at the same time. A sustained competitive advantage is obtained by a firm when a value creating strategy is not only unemployed by any current or potential rival, but also the benefits of the chosen strategy are unable to be duplicate by the other firms.

For firms to earn superior returns, their resources must have four attributes. First, firm resources are valuable when they "enable a firm to conceive of or implement strategies that improve its efficiency and effectiveness" (Barney, 1991, p. 106). Second, firm resources must be rare and not possessed by large numbers of current or potential rivals. Third, firm resources are imperfectly imitable due to one or a combination of three reasons, namely unique historical conditions, causal ambiguity, and social

complexity. "Causal ambiguity exists when the link between the resources controlled by a firm and that firm's sustained competitive advantage is not understood or understood only very imperfectly" (Barney, 1991, p. 109). A complex social phenomenon, such as interpersonal relations among managers, firm culture, and reputation among suppliers and customers, is often difficult to imitate. Fourth, specific firm resource must be so strategically valuable that they are unsubstitutable as they are either rare or inimitable to others (Barney, 1991).

Peteraf (1993) went further and tried to integrate the resource-based view of competitive advantage into a parsimonious model of resources and firm performance. The author argued that heterogeneity is similar to Ricardian rents in that "firms with superior resources have lower average costs than other firms" and "low-cost firms earn supranormal profits in the form of rents to their scarce resources" (Peteraf, 1993, p. 180). The author also proposed four conditions that had to be met in order to gain sustained competitive advantage.

First, a firm's superior resources are heterogeneous among its competitors. Second, ex post limits to competition mean that "subsequent to a firm's gaining a superior position and earning rents, there must be forces which limit competition for those rents" (Peteraf, 1993, p. 182). This analysis is similar to Barney's (1991) imperfect imitability and substitutability concept. Third, resources are considered perfectly static only when they cannot be traded (Peteraf, 1993). Fourth, ex ante limits to competition mean that "prior to any firm's establishing a superior resource position, there must be limited competition for that position" (Peteraf, 1993, p. 185). The resource-based perspective emphasizes strategic exploitation of firm assets and capabilities (Teece,

Pisano, & Shuen, 1997). Therefore, for firms to create performance advantages, bundling or assembling resources to create organizational capabilities becomes crucial (Penrose, 1959; Peteraf, 1993; Wernerfelt, 1984; Zhu & Kraemer, 2002).

The critique of the RBV mainly addresses its very static view, which does not take the dynamic nature of the resource development process into consideration in an uncertain and rapidly changing environment. Much of the ambiguity of the RBV theory has been caused by the labels used to describe firm resources. The labels are an inconsistent and conflicting use of terminology, such as stating that core competency and capabilities are interchangeable (Fahy & Smithee, 1999). In addition, Collis (1994) recognized that capabilities are likely to be surpassed by a higher order or better capability that can lead to the problem of infinite regression. In spite of these issues, however, the RBV theory does provide promising research directions for future study as a firm's resources and capabilities can be easily constructed and tested by researchers.

A resource-based view of the firm has been used as a theoretical base to understand EC business value. As Information System (IS) researchers adopted this theory, some EC scholars have begun to apply a resource-based view by linking firm resources and capabilities to firm performance (business value) in e-businesses (Barua et al., 2004; Saeed et al., 2005; Zhu & Kraemer, 2002). These scholars recognize that EC can enhance a firm's resources and capabilities.

A resource-based theory is a new way of assessing e-business value. Empirical studies have utilized the theory to understand the value of EC firms. Most EC studies used this model to understand and assess B2B net-enabled business value (Barua, Konana, & Whinston, 2005; Barua et al., 2004; Zhu & Kraemer, 2002). Researchers who have

used this model to assess B2C business value include Auger (2003), Colton (2004), and Saeed, Grover and Hwang (2005). These findings showed positive relationships between EC resources and capabilities and firm performance.

According to Rumelt (1991), differences in performance across businesses can be attributed to both industry and organizational effects. From the point of view of strategic management, performance variation may be better explained by combining the two theories, strategic typology and resource-based view, to account for both industry and organization effects. However, the weakness of the resource-based view is that its static approach does not take the dynamic nature of the resource development process into consideration in an uncertain and rapid changing environment, i.e., EC development. Perhaps a further integration of the modified competitive strategy (the combination strategy) framework with the dynamic capabilities perspective is needed.

***Dynamic capabilities perspective.*** Just as the resource-based view is criticized for its static nature, scholars have extended the theory to the dynamic capabilities perspective and addressed its use in a high-velocity environment with rapid technological change (Eisenhardt & Martin, 2000; Teece et al., 1997; Zhu & Kraemer, 2002). The resource-based view has been referenced in Information System literature “to explain how firms can create competitive advantage from IT assets, and how sustainability resides more in the organization’s skills to leverage IT than in the technology itself” (Zhu & Kraemer, 2002, p. 277). As scholars have realized the nature of the problem, they have started to develop new perspectives to address the issue.

Teece, Pisano, and Shuen (1997) purported that the dynamic capabilities framework “analyzes the sources and methods of wealth creation and capture by private

enterprise firms operating in environments of rapid technological change” (p. 509). They referred to the term “dynamic,” as firms that are able to renew competences by innovative responses and technological changes when dealing with a changing environment, especially when the nature of future competition and markets is uncertain and difficult to determine. Capabilities refer to the ability of strategic management to deal with “adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competences to match the requirements of a changing environment” (Teece et al., 1997, p. 515). The key to the dynamic capabilities perspective is to identify distinctive and difficult-to-replicate advantages that can be built, maintained, and improved over time, as opposed to RBV’s static nature.

In addition, Eisenhardt and Martin (2000) investigated the nature and evolution of dynamic capabilities as “a set of specific and identifiable processes such as product development, strategic decision making and alliancing” (p. 1105) and also examined the impact of market dynamism on those capabilities. On the one hand, dynamic capabilities are similar to the traditional concept of routines in moderately dynamic markets. On the other hand, dynamic capabilities are “simple, highly experiential and fragile processes with unpredictable outcomes” (Eisenhardt & Martin, 2000, p. 1105). The focal point these scholars emphasized is that the evolution of dynamic capabilities is led by learning mechanisms that create new value-creating strategies.

Wheeler (2002) took the perspective a step further to integrate IS and strategy and develop a net-enabled business innovation cycle (NEBIC). This scholar proposed using the dynamic capabilities theory to assess, predict, and understand a firm’s capability to create customer value by using digital networks. Built on the concept of NEBIC, Zahra

and George (2002) further proposed that the interplay of strategy, IS, and entrepreneurship can create a competitive advantage for a firm.

The dynamic capabilities perspective is a relatively new theory and in the development stage. Further refinement and empirical testing are needed to validate the theory. However, Zhu and Kraemer (2002) conducted an empirical study that showed that both the resource-based view and the dynamic capabilities perspective provide a relevant framework for assessing the value of EC. Some studies also treated website design features as an EC capability that enhances business value (Auger, 2003; Zhu & Kraemer, 2002).

### ***Website Design: Interactivity***

“Interactivity is a theoretical construct that grapples with the origins of captivation, fascination, and allure that can be inherent in computer-mediated groups” (Rafaeli & Sudweeks, 1997, p. 1). Interactivity has been widely discussed in advertising, marketing, communication, information science, computer science, sociology, psychology, and education (McMillan & Hwang, 2002).

The concept of interactivity has been defined differently. Interactivity is derived from computer-mediated communications (CMC) and can be viewed from interpersonal communication and mechanical perspectives (Coyle & Thorson, 2001; Ha & James, 1998; Sicilia, Ruiz, & Munuera, 2005). In addition, Yadav and Varadarajan (2005) categorized interactivity as either device- or message-centric. McMillan and Hwang (2002) defined interactivity according to process, features, perception, and any combination of the three. However, some empirical studies were not based on the concept of interactivity but



developed and tested similar criteria defined above (Dholakia, Zhao, Dholakia, & Fortin, 2001; Dubelaar, Leong, & Alpert, 2003; McMillan & Hwang, 2002).

“Interactivity is a process-related variable characteristic of communication settings” (Dholakia et al., 2001, p. 108) between consumers and online firms. From an interpersonal communication perspective, Rafaeli and Sudweeks (1997) defined interactivity as “the extent to which later messages recount the relatedness of earlier messages” (p. 3). Taking a mechanical perspective, Steuer (1992) defined interactivity as “the extent to which users can participate in modifying the form and content of a mediated environment in real time” (p. 84).

Ha and James (1998) described interactivity “in terms of the extent to which the communicator and the audience respond to, or are willing to facilitate, each other’s communication needs” (p. 458). According to the definition, interactivity has five dimensions:

1. Playfulness: “Play is an inner talk or conversation within oneself that provides pleasure for an individual” (Ha & James, 1998, p. 459).
2. Choice: It “may be seen as consisting of the availability of choice and of unrestrained navigation in the cyberspace” (Ha & James, 1998, p. 459).
3. Connectedness: It enables audiences to be linked with outside world as a way of broadening one’s experience (rich content) (Ha & James, 1998).
4. Information collection: “With more information about audience, an organization can tailor messages to the interests and prior knowledge levels of the audience” (Ha & James, 1998, p. 461).

5. Reciprocal communication: A website can be an interactive medium of communications between audiences and firms (Ha & James, 1998).

This interactivity dimension was tested by Coyle and Thorson (2001) and found increasing level of interactivity allured customers to the website. Dholakia, Zhao, Dholakia, and Fortin (2001) developed a similar interactivity dimension that included five components:

1. User control: It “refers to the extent to which an individual can vary the timing, content, and sequence of a communication” (p. 109).
2. Responsiveness: It is “the relatedness of a response to earlier message” (p. 110).
3. Real time interactions: It “refers to the speed with which communication takes place, particular response time” (p. 110).
4. Connectedness: It is “the feeling of being linked to a world outside a specific site” (p. 110).
5. Personalization/customization: It “reflects the degree to which information is tailored to meet the needs of the individual visitor” (p. 110).

Both studies perceived connectedness as a sub-construct of interactivity, so choice in one study seemed equivalent to user control in the other.

Interactivity is critical for a website’s success (Auger, 2005). A highly interactive website will attract and retain online shoppers. As a result, interactivity constructs propose that a more interactive website has a positive relationship to firm performance (measured by stickiness, revisit to a website, sales growth, and profitability) (Auger, 2005;

Dholakia et al., 2001; Dubelaar et al., 2003). Another compelling concept of website design is usability.

### ***Website Design: Usability***

Building a responsive website is critical for its success (Nielsen, 2003; Palmer 2002). Like interactivity, usability is derived from the human-computer interaction (HCI) field (Agarwal & Venkatesh, 2002; Palmer, 2002). However, the concept of usability has been defined and operationalized in several ways (Agarwal & Venkatesh, 2002). Usability generally takes an engineering approach to identify the design principles or guidelines that ensure a successful website design (Nielsen, 2003; Palmer, 2002). This theoretical framework proposes that the higher the level of usability the better the performance (Palmer, 2002).

Usability is “a quality attribute that assesses how easy user interfaces are to use” (Nielsen, 2003, p. 1). According to Nielsen (2003), quality attribute is further defined by five elements:

1. Learnability: “How easy is it for users to accomplish basic tasks the first time they encounter the design?” (p. 1).
2. Efficiency: “Once users have learned the design, how quickly can they perform tasks?” (p. 1).
3. Memorability: “When users return to the design after a period of not using it, how easily can they reestablish proficiency?” (p. 1).
4. Errors: “How many errors do users make, how severe are these errors, and how easily can they recover from the errors?” (p. 1).
5. Satisfaction: “How pleasant is it to use the design?” (p. 1).

The concept of usability is often equally perceived as design principles in information systems (Palmer, 2002). However, the number of design principles have doubled from five to 10 elements according to Nielsen (2005): “(1) consistency and standard, (2) recognition rather than recall, (3) flexibility and efficiency of use, (4) aesthetic and minimalist design, (5) help users recognize, diagnose, and recover from errors, (6) visibility of system status, (7) user control and freedom, (8) match between system and the real world, (9) error prevention, and (10) help and documentation” (p. 1-2).

Keeker (1997) developed Microsoft’s five usability guidelines.

1. Content is concerned with a website’s informational and transactional capabilities.
2. Ease of use requires a website to be clear and understandable.
3. Promotion is equal to advertisements that induce sales.
4. Made-for-the-medium relates a website design to the level of customization and personalization.
5. Emotion is the affective reaction generated by a website.

Agarwal and Venkatesh (2002) used this guideline to develop a measurement that would assess a website’s presence. Brinck and Hand (1998) found that usable navigation system, content, and download time were the top three criteria of usability.

The two concepts of interactivity and usability are similar. As a result, several studies, either without a theoretical framework or based on different ones, identified similar variables related to interactivity and usability (Karayanni & Baltas, 2003; Lii, Lim,

& Tseng, 2004; Tarafdar & Zhang, 2005b; Udo & Marquis, 2001). However, these studies used a thorough literature review to identify website characteristics.

Tarafdar and Zhang (2005a) examined six critical website characteristics: content, navigability, usability, download speed, customization, and security. Lii, Lim, and Tseng (2004) recognized and tested eight factors, “content, attractiveness, ease of use, personalization, interactivity, online community involvement, security, and maintenance level” (p. 487), against marketing performance. An additional four factors, speed, ease of navigation, graphics usage, and interactivity, were tested to gauge the effectiveness of an EC website (Udo & Marquis, 2001). Interactivity, navigability (usefulness), multimedia design, and marketing communication content were then identified as website characteristics that were associated with business performance (Karayanni & Baltas, 2003). These scholars tried to find what really attracted customers to a website. According to these empirical studies, website characteristics as attracting customers identified fall in either the interactivity or the usability conceptual framework.

As stated by Speaks (2000), changes in EC have happened so quickly, a theory can hardly reflect current situations. As a result, there are two current EC theories: transaction costs economics and the resource-based view of the firm. These two theories were developed for economic fundamentals and strategic management. Although researchers have utilized these two theories in various studies, there is a lack of specific B2C EC theory. As a result, there is an urgent need for theoretical development for B2C EC.

Miles and Snow’s (1978) and Porter’s (1980) strategic frameworks provide a theoretical base for B2C EC firms to empirically test the differences of strategy types on

firm performance. Concepts of interactivity and usability have been utilized to explain website performance. However, there is no study that integrates these two concepts and provides a more comprehensive view of website design.

### ***Measurements of Business-to-Consumer Electronic Commerce***

Various EC measurements have been tested at this early stage of EC development. Problems of identifying and classifying EC firms, unpredictability caused by fast development in EC technologies, and unavailability of measurement data are apparent (Wong & Lam, 2002). Various assessment methods have been used to measure B2C EC in the “new economy.” Among those methods, survey instruments are mostly used for measuring B2C EC businesses. Instruments measuring B2C EC factors are primarily on website designs including usability (Agarwal & Venkatesh, 2002; Hassan & Li, 2005; Ranganathan & Grandon, 2002), interactivity (Auger, 2005; Lee & Kim, 2002; Song & Zahedi, 2005), strategies (Kim et al., 2004; Lai & Wong, 2005), and a combination of these factors (Sung & Gibson, 2005). CEO commitment was rare.

***CEO commitment and website features.*** Zhuang and Lederer (2004) claimed that CEO commitment (or top management support) and website features are critical factors for EC success. They utilized Powell and Dent-Micallef's (1997) instrument of CEO commitment in information technology (IT) and revised it and added one item to be applied in B2C EC context. In addition, website features (having characteristics of interactivity, publishing, catalog, transaction applications, server performance, and interface) were developed by the scholars. A 5-point Likert scale was used.

Validity and reliability of the two different scales were evaluated. Both composite reliability and Cronbach's alphas were all above the minimum level of .60.

Convergent and discriminant validities were all assessed and met the minimum requirement. The data supported the position that the instruments used to measure of CEO commitment and website features are valid and reliable.

***Strategy types.*** Two instruments were used in measuring Miles and Snow's (1978) strategic typology. Snow and Hrebiniak (1980) created self-typing and descriptive paragraphs for defenders, prospectors, analyzers, and reactors. These categorical variables were then responded to by participants to identify the strategic types that correspond to their firms' strategic approach. However, a chosen strategy should also be compared with their competitors in the same primary competing market.

Snow and Hambrick (1980) discussed the methodological problems of self-typing and descriptive paragraph approaches. These researchers believed that the self-typing method is based on assumptions about the organizations from executives who have the most up-to-date strategic directions. The difficulty of this assumption is that executives may not be able to tell the difference between strategic changes and adjustments. Thus, this method can identify an intended strategy but not a realized strategy.

On the one hand, the strengths of the measurement are that it is simple to complete and to interpret (Conant, Mokwa, & Varadarajan, 1990). Prior research has shown that this method can identify the four strategy types (Garrigos-Smith et al., 2005; Gibbons et al., 2003; Matsuno & Mentzer, 2000; Parnell & Hershey, 2005; Parnell & Wright, 1993). On the other hand, the over-simplified categorical measure can only capture two or three of the 11 adaptive cycles in Miles and Snow's (1978) typology (Conant et al., 1990).

Since 1980, many strategic researchers have used Miles and Snow's (1978) strategic typology. Ample empirical studies demonstrate that Miles and Snow's strategic typology shows significant differences in performance (Apigian, Ragu-Nathan, & Ragu-Nathan, 2003; Aragon-Sanchez & Sanchez-Marin, 2005; Garrigos-Smith et al., 2005; Ginn, Young, & Beekun, 1995; Matsuno & Mentzer, 2000).

However, the instrument didn't provide assessment of reliability and validity of the strategic typology measurement. Shortell and Zajac (1990) evaluated Miles and Snow's (1978) typology by establishing predictive validity and inter-rater reliability for the instrument. Overall, Shortell and Zajac (1990) supported reliability and validity of Miles and Snow's typology.

Conant, Mokwa, and Varadarajan (1990) developed a multi-item scale to operationalize Miles and Snow's (1978) typology. Following the description of the four strategic types and the 11 adaptive cycles, 11 separate items were derived and each question was clarified by giving four multiple choice questions. Respondents were then asked to match options to their organization's strategy type. Due to the multiple choice design, a majority rule is used to categorize strategy types. When there is a tie between any two strategies, there are two rules. When there are an equal number of analyzers to either defenders or prospectors, organizations will be classified as analyzers. Whenever reactors are tied with other strategies, organizations will be classified as reactors.

The instrument has been used to investigate relationship between strategy groups and firm performance. Studies have found significant differences between firm strategies and firm performance (Gibbons et al., 2003; Parnell & Wright, 1993). Reliability was tested by using a test-retest design which yielded coefficients ranging from 0.50 to 0.82



for the instrument. A modification was made to pair up questions in the 11 adaptive cycle dimensions. Finally, the reliability coefficients ranged from 0.56 to 0.82 with a mean reliability of 0.69, very close to Nunnally's standard of 0.70. In addition, content validity was reached by a panel of organizational theorists and strategists. Procedures of constructing the instrument would not be ended until experts concurred on each question and response option and questions accurately represented the appropriate archetype.

The strengths of the methodological study were its internal validity that built on a well-known theoretical framework whose proposition had been widely tested. In comparison, this method is more complicated than the self-typing method.

**Website design.** Keeker (1997) proposed a five-category usability guideline: content (high-quality relevant information), ease of use (easy to locate what people want), promotion (appealing features), made-for-the-medium (feeling connected community), and emotion (exciting and attention-getting content). Using this guideline, Agarwal and Venkatesh (2002) applied heuristic evaluation procedures to integrate weights and ratings into the assessment of usability and tested it in airline, bookstore, auto manufacturing, and car rental companies. The researchers believed that not all five measures were equally important across different users and websites. The study was based on a usability concept. Further, the instrument ensured the content validity through expert's and subject's assessments. In addition, convergent validity was tested through two pilot studies to evaluate the viability of the research method.

The instruments were administered to 1,475 participants who actually visited a website in one of the four types of industries, with an effective response rate of 81%. Three kiosks were set up in three branches of a large retail store during a three-day period

and a \$10 gift card was given to respondents as an incentive. ANOVA and Scheffe's tests were conducted to detect differences in weightings. The results showed that content was the most important category (perceived even more importantly by investors) for this sample, followed by the ease of use category (perceived even more importantly by consumers) as rated by investors and consumers. In addition, a comparison study across industries revealed that both investors and customers rated the bookstore website highest of the four in usability.

The study had four strengths. The conceptual usability was sufficiently reviewed, content and convergent validity were strengthened, detailed procedures were described, and a considerably large sample size was tested. However, the hypothesis was not stated, and Internet users were asked to assume the role of consumers or investors to rate the websites. Such an evaluation method could be biased by having to assume a role instead of obtaining responses from participants having that role. The reliability of the study was not included. In addition, the surveys were collected in three locations, which might weaken external validity and lessen generalization, despite the large sample. Future researchers should conduct a similar study with a larger industry base, using a business-to-business (B2B) EC site, to further establish the validity of the instrument.

Hassan and Li (2005) investigated websites' usability and content usefulness by using a benchmarking approach to help individuals or teams to measure and compare the websites. As a result, a benchmarking framework was developed under the concept of usability. The procedure of developing a benchmark was constructed in five phases. The first phase was to identify metrics for usability and content usefulness from a literature review, followed by verification and suggestion of the metrics from 15 field experts in

phase two. The third phase classified metrics into objective or subjective measures and used them to develop a benchmarking framework in phase four. The last step was to test the framework on political websites in Malaysia.

A Web benchmarking framework was then created and tested on applicability and practicality. The framework first identified what to benchmark. This was followed by determining what to measure, identifying benchmarking sites, selecting evaluators, performing the benchmark, analyzing data, determining the gap, redesigning, and finally monitoring progress. Field experts used the benchmarking to assess a website's usability and content usefulness on Malaysian political websites. The results provided evidence that the benchmarking processes were easy to execute. The findings also suggest that expert review may be used as an evaluation method for redesign. Furthermore, the investigation found that the usability of several major political websites in Malaysia needed improvement (Hassan & Li, 2005).

The strengths of the study were a thorough literature review, a design based on a usability concept, and detailed procedures that allowed future replication. However, weaknesses of the study were difficulties with the Web benchmarking framework. There were four phases and eight steps. In addition, internal validity was not achieved due to the lack of hypothesis development. Further, internal validity depended upon usability experts and external validity was limited to political websites.

Future research testing the framework on EC websites in several sectors should be considered. Subjective measures should be used in Web evaluation and identifying the relative importance of each criterion in the same category could provide a direction for

future research. Finally, technological, economic, and legal factors, rather than website usability, should also be considered (Hassan & Li, 2005).

Scholars have tried to understand B2C EC firm performance through website design. Instrument development has been focused on website usability as one of the most important factors in firm performance (Agarwal & Venkatesh, 2002; Hassan & Li, 2005; Keeker, 1997). In contrast, interactivity of a website should be assessed further.

***IT support for EC competencies.*** Based on resource-based view, Ravichandran and Lertwongsatien (2005) argued that a firm's performance derives from effective use of IT to support and enhance its EC competencies. These scholars defined IT support for core competencies "as the extent to which IT is used to support and enhance the development of a firm's market access, integrity-related and functionality-related competencies" (Ravichandran & Lertwongsatien, 2005, p. 250).

Core competencies consist of three components (Hamel, 1994). First, market-access competencies are concerned with enabling firms to be close to their customers by identifying and adjusting quickly to meet their needs. Second, integrity-related competencies provide firms with capabilities to offer reliable products and services at competitive prices by integrating business processes, streamlining supply chains, and coordinating business units. Third, functionality-related competencies enable firms' to offer products and services with unique customer values or benefits by strengthening product innovation and development.

After a thorough literature review, Ravichandran and Lertwongsatien (2005) developed a 5-item scale, such as use of IT in improving responsiveness to customers and analyzing customer information to measure IT support for market-access, a 5-item scale

to measure IT support (by reengineering business processes and integrating supply chains and logistics) for integrity-related competency and a 7-item scale to assess IT support (in developing new products and services, identifying new markets, and entering new markets) for functionality-related competency. Validity of the measures was established using factor analysis to assess their convergent and discriminant validity. One item was dropped due to a low factor loading. Reliability of the measures was estimated by Cronbach's alpha, which ranged from 0.82-0.92 indicating substantial internal consistency.

Derived from a resource-based view, Barua, Konana, Whinston, and Yin (2004) argued that online informational capabilities (OIC) depend on how effective a firm can combine and coordinate its resources (IT system integration), such as IT infrastructure, business processes, and partner readiness (customer and supplier), to enhance firm performance. OIC was defined as a firm's ability to exchange strategic and tactical information with its customers and suppliers. To obtain OIC, system integration, process alignment, partner readiness, and digitization level are required. System integration means that a firm is able to integrate its IT systems allowing online information sharing and transaction execution in the value chain (mainly data flowing from customer to supplier). Process alignment is "the degree of fit between business processes and the underlying technology to facilitate online transactions and information sharing" (Barua et al., 2004, p. 589). Partner readiness means that customer and supplier are ready to transact business online. Digitalization level refers to how a firm can handle its daily business activities electronically with customers (sales, services, and new customer acquisition) and suppliers (procurement).

The survey development took a rigid approach. First, interviews with managers in large manufacturing companies were initiated. Second, academic and practitioner-oriented literatures were thoroughly reviewed. Further, the instrument was pre-tested by faculty members, doctoral students, and managers. Eventually, a 39-item survey was created to measure OIC, system integration, process alignment, partner readiness, and digitization level.

Instrument reliability and validity were tested and established. Construct validity was established by convergent ( $t$  tests for the factor loadings) and discriminant validity (tested by confidence interval). The reliability of the measures as tested by the Cronbach's alpha, ranged from 0.74 to 0.93, indicating a high level of internal consistency.

Although the two instruments seemed to measure different constructs, they were actually comparable. Constructs of online (or EC) information capabilities and IT support for core competencies both emphasize IT system integration internally and externally to enhance customer value in the value chain. A firm that can better integrate and coordinate different systems across different business units and business partners is believed to have competitive advantages over its rivals and to have higher financial performance (Barua et al., 2004; Ravichandran & Lertwongsatien, 2005).

### ***Business-to-Consumer Electronic Commerce in Taiwan***

A partial literature review is based on Taiwan's literature. First, a general description of B2C EC development in Taiwan is provided. Second, a sketch of online financial services, in particular the e-brokerage sector, is given for its representativeness and significant growth as a B2C EC service retailer in Taiwan.

### *Status of B2C Development*

The prospect for B2C development depends on Taiwan's e-readiness (infrastructure). Indications of e-readiness have been evident based on Taiwan's prominent worldwide rankings. For instance, Taiwan was ranked 15<sup>th</sup> out of 104 countries in a 2004-2005 Global Information Technology Report, according to the World Economic Forum (WEF) and was in 11<sup>th</sup> place in global competitiveness in 2005 by the Swiss International Institute for Management Development (IMD) (Department of Commerce [DOC], 2005). Apparently, Taiwan's e-readiness is extremely high as measured by global standards.

Taiwan's B2C development is significantly influenced by the Internet penetration (diffusion) rate, a pre-condition for B2C EC activities to prevail (Chen, 2003). According to Taiwan's Directorate General of Telecommunications (TDGOT) statistics, a total of 3, 943, 922 broadband subscribers accounted for 49.3% of Internet users; in addition, the frequently online population was estimated at 9.25 million, representing 41% of penetration in March 2005 (Department of Commerce, 2005). Internet usage penetration (as of total population) of U.S. and selected Asia countries are illustrated in Table 2-1 (Internet World Stats, 2006). Taiwan has a relatively high penetration rate not only in comparison to Asia but also to the global level. Such high penetration rate provides a foundation for B2C to grow.

According to the Institute for Information Industry (IFII) (2005), the age range from 20-39 was the main online consumer group in Taiwan. Among the population, the largest two groups of online consumers were between the ages of 30-39 (37.8%) and 20-29 (36.9%). Interestingly, women comprised 56% of total online shopping, outnumbered

men in Taiwan. A synthesis of information found in several countries is shown in Table 2-1.

Table 2-1

*Internet Penetration Rates of Selected Countries in December 2005*

Countries	Penetration Rate (% as of population)
1. United States	68.10
2. Hong Kong	69.20
3. Japan	67.20
4. Singapore	67.20
5. South Korea	67.00
6. Taiwan	60.30

Taiwan's total online purchases are forecast to have significant growth. According to estimates by IFII, the total amount of online purchases increased to NT\$ 51.07 billion (around US\$ 1.60 billion) in 2005. By 2009, the amount is expected to reach NT\$ 154.48 billion (around US\$ 4.83 billion), with a 31.88% compounded annual growth rate from 2005 (Institute for Information Industry, 2005). Yet, online sales only accounted for 1.65% of total retail market sales in 2005. Thus, there is a plenty of rooms for B2C EC retailers to grow in Taiwan.

Online stores are gradually moving toward profitability according to an IFII (2005) survey, which found 34.61% of B2C EC companies made profits and another 12.59% of online stores were able to break even annually. In contrast, only 31.47% of online stores



lost money. As online firms are building up experiences of managing online stores, those B2C EC firms are likely to turnaround.

Three major industries virtually make up the online market. According to an IFII (2005) survey, 85.67% of the online market was constituted by the travel services, financial investment, and 3C products in 2005. Travel services comprised 60.08%, investment 18.38%, and 3C products 7.21%. Among the three industries, financial investment was the only sector that enjoyed significant growth in 2005 (however, previous surveys didn't include this sector; therefore, exact growth rate couldn't compute). Both travel services and 3C products declined 8% and 10%, respectively in 2005 from the prior year. Thus, the review of Taiwan's literature focused on the online brokerage sector.

### ***Status of Online Brokerage***

Among various industries, the financial sector is the first and most highly developed in applying Internet technology for online banking and brokeraging (Chang et al., 2000; Dubelaar, Tsarenko, & Gabbott, 2003). The financial sector has an information-intensive characteristic which makes the sector the most suitable target to utilize the Internet to provide investors with tremendous volumes of investment information (Chang, 2004; Chen, 2001; Lin, 2002; Ou & Chen, 2001). As a result, the Internet allows online brokers to reduce costs for online transaction (Chen, 2001; Dubelaar et al., 2003). For EC trading, online brokerage is one of the fastest growing, successful, and profitable sectors among different Internet sectors (Chang et al., 2000; Lee & Kim, 2002; Saini & Johnson, 2005). Consequently, the following section provides a brief review of Taiwan's online brokerage sector.

Taiwan's online stock trading started in November 1997 and has been growing considerably since. According to the Taiwan Stock Exchange (TSE) (2004), online securities trading value increased 44.28% annually to NT\$7.45 trillion in 2004. In addition, online securities trading value as a percentage of total market share increased to 17.38% in 2005 from 15.70% in 2004 (TSE, 2005). Compared with a growth rate increase of 25% in the U.S. and 55% in South Korea in 2003, sizeable market growth is expected in Taiwan's online securities trading (Chang, 2004).

Two types of online brokers exist in Taiwan. One is from the securities brokerage houses and another is from the banking securities brokers. However, banking brokers constituted only a small fraction of total trading value while securities brokerage houses comprised over 90% of total market trading value (TSE, 2005). The reason for this was due to prior banking laws and regulations (before 1999) that prevented banks from operating securities brokerages. As a result, the top 10 online brokers were all from the securities brokerage firms, and made up 73.67% of total online trading market share. In addition, the top three securities brokerage firms compiled nearly 42% of the total online trading market share (DOC, 2005). Leaders of the online brokerage sector are likely to continue this trend.

Several researchers sought to understand the development or influence of Internet-based stock trading in Taiwan. Chang, Hwang, and Ging (2000) investigated the development of online stock trading. Researchers used literature reviews, website analyses, and face-to-face interviews of four securities firms. The findings suggest that online stock trading had an impact on reducing the number of branch offices as more

customers trade stocks online. In addition, the capability of online stock trading caused more customers to invest in stocks online.

Chen (2001) further researched e-brokerage online trading. The researcher first discussed the development of online stock trading, followed by risks of online securities trading. Sequentially, the need of online security and trust mechanism was emphasized. In the end, suggestions were given in the areas of strategic alliances, fostering human resources, increasing online financial services, and a multi-channel development as strategic ways to enhance competitive advantage.

Lin (2002) investigated website content of securities brokerage firms. Website content (29 items) were grouped into image promotion, online marketing, financial commodity information, answers to questions, and value-added service. Seventy securities firms' websites were eligible for the study. The findings indicated that the three most frequently presented information or functions were communication channels, company introductions, and commercial advertisements. Securities firms provided abundant financial commodity information.

Three related researches were conducted on B2C EC business models in relations to performance in Taiwan. Chang (2004) explored the development of the online securities sector and the impact of business models on performance. Business models were categorized into online, hybrid, and traditional brokers. Financial ratios were used as performance measures. The results showed that the online securities sector is at the growth stage and top leaders of the sector will continue to win (winner takes all). In addition, performance measures of financial structure, operating efficiency, and cost control were better for pure players, followed by hybrid brokers. Traditional brokers

were the worst performers. Online and physical stores are more likely to be complementary rather than replacement. Previously, Chen (2001) conducted a similar study and found no significant differences between business models on performance.

On the whole, a bright prospect of B2C EC firms in Taiwan is expected and significant growth is anticipated for online securities trading. B2C EC studies of the online brokerage sector in Taiwan have focused on the development of the sector (Chang, 2004; Chang et al., 2000; Chen, 2001), business models and firm performance (Chang, 2004; Cheng, 2001), website content, and website success factors (Lee, 1999; Lin 2002; Zhu et al., 2003).

### ***Business-to-Consumer Electronic Commerce Factors and Firm Performance***

Empirical literature reviews of the impact of B2C EC factors on firm performance are divided into four groups: CEO commitment, strategy type, website design, and EC capabilities (IT system integration). The impact of these B2C EC attributes (independent variables) on firm performance (dependent variable) is found to be favorable.

### ***CEO Commitment and Firm Performance***

Zhuang and Lederer (2004) performed a non-experimental quantitative study examining top management commitment, business process redesign, and the impact of IT planning on B2C electronic retailing sites. The study hypothesized that CEO commitment, process redesign, IT planning, and site features affected EC site's success. A non-probability sampling plan resulted in a sample of 458 firms, with a response rate of 12%. Independent variables included CEO commitment, process redesign, and EC planning (each with three questions). In addition, six website features (interactivity, publishing applications, catalog applications, transaction applications, server performance,

and interface) were also independent variables (each with three questions) and a questionnaire of website features were tested by confirmatory factor analysis. Dependent variables were measured by firm performance, which also was conducted through a survey.

Inferential statistical regression analysis was conducted to test the results. In addition, structural equation modeling (SEM) was applied as a primary analytical tool. Three out of four hypotheses were supported. CEO commitment and EC planning significantly predicted EC site features which in turn were statistically significant in predicting firm performance. Business process redesign was not significantly important to EC site features. Moreover, multivariate regression pointed out that four out of the six EC site features (publishing application, catalog applications, interactivity, and interfaces) were statistically significant in predicting firm performance. However, transaction application and server performance were not significantly related to firm performance.

Strengths of the study were provided by clear constructs and hypotheses. As a result, internal validity was high due to quality data and analysis. In addition, clearly defined procedures allowed for future replication. With a larger sample size, generalization of the study could be applied to B2C EC firms.

Several future research possibilities are available based upon this study. Future research might be conducted specifically related to two EC site features (transaction application and server performance) to determine if a better explanation could be found. Future directions might find new EC features that affect firm performance. Future researchers can divide electronic retailers by product types to explore different results. The study can also be used to examine the same factors in other industries, such as

manufacturing and services. In addition, further investigation could validate the current instrument. In the future, Web- and email-based research methods should determine a better means of increasing response rates. Other impacts apart from EC site features on firm performance should be considered. Finally, other attempts should be made to obtain objective firm performance measures.

As suggested by several scholars, CEO commitment is considered one of the most influential factors on firm performance (Epstein, 2005; Hughes & Stone, 2002; Kuo, 2003; Yang et al., 2002; Zhuang & Lederer, 2004). Therefore, a large amount of effort should be devoted to this area to have a better understanding of B2C EC impact on financial performance.

### ***Strategy Types and Firm Performance***

Three studies discussed strategies of EC companies and how those strategies reflect on firm performance. Strategic frameworks of Miles and Snow's typology and Porter's generic strategies have been applied to EC firms. In addition, a study of business types (B2B, B2C, and non EC firms) was included to see whether different strategies produced differences in performance.

Saini and Johnson (2002) conducted an empirical study testing a strategic typology developed by Miles and Snow on B2C EC firm performance in the online financial industry. The study population consisted of 330 online brokerage firms in the U.S. and Canada. There was a 39% response rate, or 122 useful surveys. Independent variables were represented by the four types of strategy: prospector (responds rapidly to new opportunities), defender (maintains a stable market), analyzers (maintains a stable but limited product line), and reactor (responds only when forced to by the environment).

Dependent variables were measured by website performance (a site's visitor base, customer base, and customer conversion rate) and EC performance (sales, growth, and profitability).

The researchers hypothesized that a prospector strategy has a positive effect on both performance measures. In addition, a prospector strategy would have the greatest impact on performance of the four types of strategies. Confirmatory factor analysis was used to test convergent and discriminant validity for the construct. Composite reliability was tested and found to be greater than 0.70.

The method of ordinary least square (OLS) was used to analyze the results. The findings indicated that a prospector strategy positively influences both the website and EC performance of online financial services. Further, the results provided evidence that the prospector strategy has a significantly greater effect than analyzer and reactor strategies, but there is no significant difference in performance between prospector and defender strategies.

In this study, internal validity was derived by a theoretical framework and hypotheses and detailed procedures allow replication. The result of the study can only be generalized to online securities brokers in North America. Thus, future researchers should consider replicating and validating the study in other countries.

Another competing strategic framework based on Porter's generic strategies on firm performance was later conducted by Kim, Nam, and Stimpert (2004). These researchers performed a non-experimental quantitative study testing the applicability of Porter's generic strategies in EC firms and how these strategies influenced firm performance. A probability random sampling plan was conducted by e-mail on 75

Korean firms, divided into “pure players” and “clicks and bricks” groups. Propositions assumed that the EC firms were applying Porter’s generic strategies of cost leadership, differentiation, and focus. Among the propositions, differentiation and hybrid strategies were assumed to have higher performance. Measures used for the independent variables were a questionnaire containing 18 variables grouped into strategic dimensions (using factor analysis) and strategy types (applying cluster analysis). A pilot test was used to confirm content validity of the survey instrument. In addition, reliability was tested by using Cronbach’s alpha ( $\alpha$ ). Measures of the dependent variables consisted of five subjective performance measures: revenues, rate of growth, growth potential, profitability, and overall firm performance.

Duncan’s grouping test was operated to distinguish the impact of different strategies on overall firm performance. The results suggested that Porter’s generic strategies can be applied to B2C firms. The best performers were firms that combined cost leadership and differentiation (a hybrid strategy) for all performance measures. In contrast, the worst performers were firms that only utilized cost strategy. Across business types, the findings indicated that “pure players” with hybrid strategies outperformed “clicks and bricks.” This result is different from those of other studies, demonstrating that “clicks and bricks” outperformed “pure players” among e-tailers (Liang, Lin, & Chen, 2004; Vishwanath & Mulvin, 2001).

Strengths of the empirical study were indicated by internal and external validities. Internal validity was the use of research questions and deriving propositions from Porter’s generic strategies. These resulted in a high level of data quality, data analysis, and clearly defined procedures that permit future replication. External validity was



partially achieved by random sampling; however, sample size was too small to draw generalizations.

Future research should include an empirical study with a larger sample of e-business firms. Secondly, future study should be conducted in other countries to confirm that Porter's generic strategies apply in EC firms. Thirdly, the application of other objective measures suitable to cyberspace should be considered. Finally, as only subjective performance measures were used in the study, future studies should use objective financial performance measures.

Lai and Wong (2005) conducted a non-experimental, causal comparative and quantitative study to find which business types and strategies affect firm performance. A non-probability sampling plan resulted in a self-selected, data producing sample of 119 EC companies in Hong Kong. Independent measures were four strategies derived by factor analysis. Dependent variables were measured by ROA and ROE. In addition, business types, such as B2B, B2C, and non-EC, played a moderating role.

Inferential statistical analyses including *t*-tests, correlation, and regression were used to analyze the findings. There were few differences between EC and non-EC firms. However, business types played a significant moderating role in the relationship between e-strategies and corporate financial performance. In addition, strategies affected EC firms more significantly than non-EC firms. Among the business types, B2B companies were significantly affected by all strategies except marketing related ones. B2C companies significantly benefited from saving-related strategies. Interestingly, marketing-related strategies were significantly effective for the non-EC companies. In general, non-EC firms performed better than EC firms in 2001.

The weaknesses of the empirical study were the lack of theoretical and hypothetical bases. In addition, the literature review was insufficient. The reliability of the survey instruments was not presented. However, the research procedures were clearly defined and thus made replication possible.

There are several suggestions for future research based on the study. First, this study should be applied to other countries. Secondly, a larger sample size across EC business types and non-EC firms would increase the probability of generalizing the results of the study. Thirdly, other objective non-financial measures might be a better performance measure for EC companies. Finally, future research should consider using financial measures other than ROA and ROE for EC firms.

In summary, the results show that e-strategies are associated with firm performance and that traditional strategy types can be useful for EC firms (Kim et al., 2004; Lai & Wong, 2005; Saini & Johnson, 2002). However, strategies used in EC studies are relatively insufficient compared to website design features (Auger, 2005; Lee & Kim, 2000; Lii et al., 2004; Lohse & Spiller, 1999; Ranganathan & Grandon, 2002). Thus, future research should validate existing studies and develop e-strategies that are related specifically to B2C EC firms.

### ***Website Design and Firm Performance***

Lee and Kim (2002) carried out a non-experimental quantitative study examining Web design features and design principles on customer satisfaction and loyalty and firm performance. The study concentrated on online stock trading sites in Korea. The researchers combined three theories: economic cost aspect, strategic value creation, and consumer behavior, to arrive at its hypothesis. Research on online stock trading sites was

conducted using a non-probability purposive sampling plan which produced a sample of 31 major online stock trading sites in Korea.

Measures of independent variables were divided into three design principles, each containing two design features. The three design principles were functional convenience (information gathering and order making process); representational delight (interface to the system and to people); and structural firmness (robustness and security). In addition, the dependent variable was measured by total transaction volume as a financial performance indicator and satisfaction and loyalty as non-financial performance measures serving as moderating variables. Website design principles and features were compiled through a literature review. In addition, a committee of twelve experts with at least five years of experience monitored the design features. Finally, the online survey used a 7-point Likert scale and examined data by factor analysis using the Varimax rotation method. The survey was conducted with 6,576 respondents.

Inferential statistical analyses using stepwise regression and structural equation modeling were applied to analyze the associations among the variables. The results of the structural equation found that the three design principles of convenience, delight, and firmness (six design features), were all statistically significant with customer satisfaction. In addition, regression analysis showed that satisfaction and loyalty were also statistically significant and positively correlated to firm performance (total transaction volume).

Internal validity was obtained by theories leading to hypothesis testing through a comprehensive and up-to-date literature review. The study used a large sample and provided a high level of quality data, strong methods of data analysis, and clearly defined and replicable procedures. However, the study was highly specific for the e-brokerage

sector and thus, generalization to other sectors is not possible. Limitations of the study include the fact that it was conducted in Korea and only in one specific industry. Therefore, future researchers should apply and validate this study to other countries and industries.

Auger (2005) conducted a non-experimental quantitative study exploring the relationship between website design and the performance of small businesses. Website design was determined by the level of interactivity and design sophistication. Based on the construct of interactivity, the level of interactivity was hypothesized to be positively correlated to performance and the use of multimedia should motivate consumers to visit websites.

A non-probability purposive sampling plan resulted in a self-selected sample of small businesses. Independent measures of interactivity (with 11 features) and sophistication (with 14 items) were conducted through an e-mail questionnaire, with a low response rate of 15.6%. Dependent measures were also explored in the same questionnaire by obtaining the average number of weekly visitors to the site; sales, profitability, and overall performance. All instruments used in the study reported reliability only. In addition, three control variables including market turbulence, size of the firm, and the age of the website were incorporated into the study.

Inferential statistical analyses using correlations and hierarchical regression analysis were employed to analyze the findings. The results showed that the level of interactivity was statistically significant and positively related to overall performance, but showed no significant relationship to the number of visitors to the site. When the moderating variable of market turbulence was added, the results showed that interactivity

was a significant factor and was positively related to overall performance when market turbulence was high. At the same time, there was no significant relationship to overall performance in the low level of market turbulence. The second construct, design sophistication, was found statistically significant and positively correlated to the number of visitors to the site and showed no significance or association with overall performance. However, the younger the website the stronger the relationship is between design sophistication and the number of visitors to the site (performance measure).

Internal validity was achieved by a sufficient literature review which resulted in an interactivity construct and hypothesis testing. A considerably high level of data analysis, and well-defined procedures permitted replication. However, a purposive and self-selected sampling was used specifically for small online businesses. Further, a low response rate limited generalizability. As a result, external validity was constrained and excluded generalization to larger online businesses.

This study's limitations also provide a direction for future research as "a better operationalization of the design constructs would enable researchers to analyze the relative importance of specific interactivity and design features" (Auger, 2005, p. 134). Secondly, generalization of the study can be improved by a broader sample of industries. Thirdly, overall performance can be measured objectively by other indicators to increase the validity of the study. Other performance measures such as ROS or ROE should be applied in future research. The study should also be replicated to test larger online businesses and to validate the measurement instrument. Finally, important moderating factors such as Web age (years operating online) and business models should be considered in the future.

Ranganathan and Grandon (2002) performed a non-experimental empirical study for the purpose of exploring the impact of website-related factors for online sales. A non-probability sampling plan produced a sample of 487 websites. Measures of website related factors derived from an extensive literature review and were grouped into four dimensions (privacy, security, content, and design), which were the independent variables. The dependent variable was the logarithm term of online sales.

Inferential statistical employing multiple regression was used to analyze the relationships among variables. Nine variables were found to be statistically significant for online sales. In the content category of the website, four variables were explanatory for online sales. The most influential factor was the frequent update of content with the highest beta ( $\beta$ ) coefficient. Other factors were the information of the firm, followed by the presence of a frequently asked questions (FAQ) section and decision aids to online sales. Within the design group, only the use of multimedia was found to be statistically significant and negatively correlated to online sales. This implied that higher use of multimedia is likely to cause longer download times and thus affect consumers' willingness to buy online. Interestingly, the result showed that all three variables related to the security of the website were statistically significant and positively affected online sales. The use of individual accounts, password, and secure data transmission were likely to boost the confidence of consumers and thus result in higher Web sales. The last category (privacy) found that one item of presence and content of privacy statement was statistically significant and positively associated with online sales. In short, the results showed the importance of updating website content and enhancing website security and privacy as factors likely to increase online sales.

The study's internal validity was demonstrated by a sufficient literature review and clear and replicable procedures. However, weaknesses were shown in the lack of theoretical groundwork and hypothesis development. Several limitations of the research can be overcome in future studies. First, future researchers can investigate some vital website features over a longer period of time. Secondly, the sample in the study only included large retailers and therefore, further study on smaller e-tailers should be conducted. Thirdly, the study only considered website variables; thus, other factors that are likely to impact sales, should be included in the future, such as marketing, promotion strategies, and brand name.

Overall, the literature review of website design features found that scholars have used website design features as factors in firm performance. However, there has been no consensus on how and what variables should be measured as website design features. Therefore, researchers constructed criteria, such as level of interactivity, sophistication of the design, content, security, and privacy in addition to design principles of convenience, delight, and firmness (Auger, 2005; Lee & Kim, 2002; Ranganathan & Grandon, 2002). Future study should take an integrative view, and test the integrative website features on other firm performance measures.

### ***EC Capabilities (Competencies) and Firm Performance***

Rooted in a resource-based view, different variables of IT resources and capabilities (or competencies) have been proposed. Scholars are trying to understand the impact of IT system integration on firm performance (Barua et al., 2004; Ravichandran & Lertwongsatien, 2005; Saeed et al., 2005) and the results are encouraging.

Barua, Konana, Whinston, and Yin (2004) organized a quantitative and non-experimental study investigating net-enabler (how the Internet is leveraged) to create business value. By exploiting the Internet, companies are able to integrate systems internally and externally to create value in the value chain. Employing a resource-based view, these scholars proposed a model of how a firm's ability to combine and coordinate its resources (business processes, IT, and partner readiness) to create online information capabilities (OIC) enhances operational and financial performance.

Data collection by phone and an online survey was used with traditional manufacturing firms, distributors, wholesalers, and retailers who had the ability to conduct business online. Structural equation modeling was used to analyze the collected data. Several goodness of fit indices (of the measurement model) indicated a strong fit between the structural model and the data. The results showed that online information capabilities lead to higher financial performance through customer-side digitalization (partner readiness). In contrast, the impact of the supplier-side digitalization on financial performance is minute but significantly negative. Further, this study found that system integration across the organization is a crucial factor in strengthening online information capabilities which are strongly related to performance measures.

Strengths of this study are that it was based on a well established resource-based theory, a thorough literature review, and clearly defined procedures allowing replication. All of these factors are indications of strong internal validity. However, the sampling plan was not stated and data collection including four different industries was conducted by outsiders (hired by the researchers). Thus, the external validity of the study had weaknesses that did not allow for the conclusions to be generalized.



Limitations of the study include the use of financial performance measures which were self-reported and could be biased. The lack of certain performance measures (online sales per employee) limited the statistical analyses. On the other hand, the sample of this study included a wide range of small to large firms. Future study should compare differences in OIC on financial performance between small and large firms.

Ravichandran and Lertwongsatien (2005) conducted a quantitative empirical study examining the impact of information systems resources and capabilities on firm performance. Drawn from resource-based theory, these scholars proposed that firm performance can be explained by how effective a firm can utilize its information technology to support and augment its core competencies. As a result, a model that integrates information system (IS) resources, IS capabilities, and IT support for core competencies, can enhance firm performance.

A mail survey was conducted to collect data from Fortune 1000 firms. A total of 710 mailed surveys resulted in 129 responses, yielding a response rate of 18.2%. Partial least square statistical analyses were applied to analyze the results. First, evaluation of the structural model was assessed and resulted in eliminating IS support maturity and IT support for integrity-related competency. Further, the structural model was reassessed and the results found “52 percent of the variance in IS capabilities, 31.6 percent of the variance in IT support for core competencies, and 29.5 percent of the variance in firm performance were explained by the model” (Ravichandran & Lertwongsatien, 2005, p. 252). Overall, the results support the notion that IS can improve firm performance when its capabilities are integrated with distinctive firm competencies.

Internal validity was established by a thorough literature review that led to a theoretical based model and clearly defined procedures permitting replication. External validity allowed for generalization of the results within the scope of this study. The fact that constructs of IT support for integrity-related competency and IS support maturity didn't fit the nomological network of relationships in this study provides an opportunity to validate the constructs using a different data set in the future. Data were collected only from IS executives. In the current study, data was collected only from IS executives. Thus, future study design should allow for multiple respondents.

Saini and Johnson (2005) conducted a mixed qualitative and quantitative empirical study investigating the impact of organizational capabilities on EC website and financial performance in the U.S. e-brokerage services sector. Capability perspective (resource-based theory) conceptualized into IT, strategic flexibility, and trust-building capabilities, were hypothesized to have positive effects on both performance measures. In addition, market orientation consisted of responsive and proactive constructs, to leverage EC capabilities. Consequently, several market orientation hypotheses were developed under those constructs.

A non-probability purposive sampling plan was used which produced a sample of 122 e-brokerage firms. Three capabilities were the measures used for the independent variables. The interaction of the two concepts (EC capabilities and market orientation) was also included. A specific survey instrument, measuring the independent variables, was developed by extensive field interviews with senior managers. A pre-testing on the instrument was then conducted. Further, the instrument was analyzed by confirmatory

factor analyses to assess content validity of its constructs. In addition, convergent and discriminant validities were examined.

Dependent variables were measured in terms of website performance, including the number of website visitors, attraction rate, conversion rate, and frequency of account access. EC performance consisted of profitability, sales volume, sales growth, market share, and return on investment (ROI). Firm size, interfunctional coordination, and administrative function were the control variables. In addition, the two market orientations (responsive and proactive) were employed as moderating variables.

Inferential statistical analyses using correlations and a three-stage least squares model were conducted to analyze the data. The findings showed that proactive market orientation enhanced the effect of the IT capability on EC performance, but not on website performance. For the interaction between strategic flexibility capability and proactive market orientation, website performance of proactive market-oriented firms was enhanced. Moderating factors such as firm age, Web age, and the nature of the firm had no impact on either performance measure. However, website performance had a significantly positive correlation with EC performance.

According to three-stage least squares analysis, strategic flexibility and trust-building capabilities, the interaction of both IT and strategic flexibility capabilities as well as proactive market orientation and website performance, had a significant predicting power with a  $R^2$  of 0.49, on EC performance. Three capabilities had no significant predicting power on website performance but, firm size, nature of the firm, proactive market orientation, and interaction of strategic flexibility capability on both

proactive and responsive market orientation, were significant predictors of website performance, with a  $R^2$  of 0.26.

The study identified EC specific capabilities which were tested on firm performance. Strengths of the internal validity were obtained by hypothesis testing based on capability and market orientation perspectives. This resulted in a high level of data quality, data analysis, and clearly defined procedures that allowed for replication. However, external validity was limited by research conducted specifically in the e-brokerage service sector, so generalization was constrained to e-brokerage.

As a result, future research can study other EC contexts (such as online retailers) to ensure generalizability. Other firm-level moderating factors influencing firm capabilities should be included in future study. Performance measures should apply objective indicators to add value to the study. In addition, a longitudinal study should be considered to clearly explain the causal attributions hypothesized in the study.

Saeed, Grover, and Hwang (2005) performed a non-experimental and quantitative study investigating the impact of EC competence to customer value, which led to firm performance. The resource-based view was proposed in considering a firm's resources to build competence and then contribute to firm performance. A consumer service life cycle (CSLC) model was proposed in which EC provided better services and thus, created a long term relationship (customer satisfaction and loyalty) with customers.

A non-probability and self-selected sampling plan resulted in a sample of 73 EC companies constrained by limited historical financial data. Independent variables included EC competence measured in two ways: experience and investment in Information Technology (IT). Dependent variables were measured by Tobin's  $q$  as a

long-term financial measure and by EVA as a short-term financial measure. Customer value played a mediating role and was measured by a questionnaire on the functionality of CSLC (comprised of four stages: requirement, acquisition, ownership, and retirement). In addition, six control variables including industry growth, firm size, advertising expenditure, product type, ratio of online sales to total sales, and segment affiliation (B2C and B2B) were used in the study.

Inferential statistical analysis of ordinary least square (OLS) regression was conducted to explain the findings. The results showed that EC competence had a direct effect and was statistically significant on EVA and Tobin's  $q$ . When customer value was a mediator, the results indicated the requirement stage was significant on EVA. In addition, facilitation at the ownership stage was statistically significant on Tobin's  $q$ . Overall, "firms with higher electronic commerce competence seem to be favoring requirements and ownership stages for enhancing customer value and, thereby, firm performance" (Saeed et al., 2005, p. 246).

Internal validity was established by using a resource-based view and customer behavior theories, and well-developed hypotheses were formed and tested. As a result, data quality, data analysis, and clearly defined procedures were achieved. However, a relative small sample size weakens external validity.

One direction for future research might be "exploring the relationships between the value drivers and the extent of consumer value in their use" (Saeed et al., 2005, p. 249). A further study can be conducted on improving understanding of the retirement stage and replication of the study can be constructed on a global sample of EC firms to

increase the generalizability of the study. Finally, future research can integrate processes and upstream value chain integration connected to firm performance.

An interesting study based on a RBV and dynamic capabilities perspective was conducted by Zhu and Kraemer (2002). These scholars found that EC website capabilities of information (about products and services), transaction, and interaction (customization) combined with supplier connection (integration of IS systems) are significant factors on inventory turnover but not on profitability measures, such as sales per employee and gross margin. They explained that these two profitability measures might be too remote to be related with EC capabilities and there was the possibility of a time lag between the use and consequence of EC initiatives.

### *Synopsis*

Resource-based theory has been used as a base to understand how the Internet (integrated to IT or IS) affects firm performance. These results seem to advocate that EC capabilities or competencies and how they are being integrated can be influential sources for competitive advantages that may positively contribute to firm performance (Barua et al., 2004; Ravichandran & Lertwongsatien, 2005; Saeed et al., 2005; Saini & Johnson, 2005; Zhu & Kraemer, 2002; .

In summary, the empirical literature review covered mainly CEO commitment, strategy, and website design and EC capabilities (IT system integration) related to firm performance (Table 2-2). The results showed that B2C EC factors have a positive effect on firm performance (Auger, 2005; Barua et al., 2004; Lee & Kim, 2002; Liang, Lin, & Chen, 2004; Ranganathan & Grandon, 2002; Ravichandran & Lertwongsatien, 2005; Saeed et al., 2005; Saini & Johnson, 2005; Zhuang & Lederer, 2004). However, there is

no integrative study of several or all these B2C EC factors. In addition, there is no general agreement on single financial and perceptual measures or multiple firm performance measures. Thus, future empirical study should try to integrate the major possible B2C EC attributes or factors and validate financial and perceptual (non-financial) measures from prior studies.

Table 2-2

*Summary of Empirical Studies*

Authors (Year)	Independent Variables	Dependent Variables		Findings
		Financial	Perceptual	
1. CEO Commitment and Firm Performance				
Zhuang & Lederer (2004)	1. CEO commitment 2. Process design 3. EC planning 4. EC site features: interactivity, publishing, community, catalog, transaction applications, server performance, and interface	5 financial performance items (mainly sales growth and profitability) in a survey		CEO commitment and EC planning predicted EC site comprehensiveness (features), which predicted firm performance. The multivariate regression pointed out that 4 of the site features: 1. publishing applications, 2. catalog applications, 3. interactivity, 4. interfaces, predict firm performance at a significant level.
2. Strategy Types and Firm Performance				
Kim, Nam & Stimpert (2004)	Strategic variables (18 items)	1. Revenues 2. Rate of growth 3. Growth potential 4. Profitability 5. Overall firm performance	Average site traffic and visits	The results showed that the best performers are those firms applied hybrid strategy across all performance measures. On contrary, the worst performers are those firms utilized cost leadership strategy only. In addition, pure players with hybrid strategy were the best performers on subjective performance measures. Non-EC companies performed better than EC companies. Business types significantly moderated relationships between e-strategies and firm financial performance.
Lai & Wong (2005)	1. Business types (B2B, B2C, and non-EC) 2. E-strategies (savings-related, structure-related, policy-related and marketing-related)	1. Profit margin 2. ROA 3. ROE		E-strategies affected EC firms more than non-ECs. B2B companies benefited by all strategies except marketing related. B2C firms benefited only from saving-related strategies. Marketing related strategies were more effective for non-ECs. Overall, non-ECs performed better than ECs.
Saini & Johnson (2002)	Miles and Snow strategic typology: 1. Prospector 2. Defender 3. Analyzer 4. Reactor	1. Sales amount 2. Sales growth rate 3. Profitability	1. Site's visitor base. 2. Customer base. 3. Customer conversion rate.	A prospector strategy has positive impact on both performance and has significant greater impact than analyzer and reactor strategies but there is no significant difference between prospector and defender strategies.
3. Website Design and Firm Performance				
Auger (2005)	1. Level of interactivity (11 features) 2. Sophistication of design (14 items)	1. Sales growth rate 2. Profitability	Log (average number of weekly visitors to the sites)	Overall performance is positively significant related to the level of website interactivity and the market turbulence in terms moderates on the relationship between interactivity and performance. A positive relationship exists between sophisticated design and the number of visitors.



Table 2-2 (Continued)

Authors (Year)	Independent Variables	Dependent Variable		Findings
		Financial	Perceptual	
3. Website Design and Firm Performance				
Lee & Kim (2002)	3 design principles each contain 6 design features	Total transaction volume made per month	1. Average factor score for each website 2. Satisfaction and loyalty.	Three design principles (convenience, delight, and firmness) positively affected the level of satisfaction and thus increased customer loyalty. In addition, customer loyalty is positively significantly related to transaction volume.  Content variables were significant in explaining online sales. The use of multimedia was negatively significant related to online sales in design category. All three security variables were found positively significant to online sales. For privacy category, presence and content of privacy statement was positively significant associated with online sales.
Ranganathan & Grandon (2002)	1. Privacy 2. Security 3. Content 4. Design of the website	Online sales amount		
4. EC Capabilities (or Competencies) and Firm Performance				
Barua, Konana, Whinston, & Yin (2004)	1. Business processes 2. Partner readiness 3. System integration 4. Online information capabilities 5. Digitalization level	1. Revenues/employee 2. Gross profit margin 3. ROA 4. Return on invested capital (ROIC)		System integration and online information capabilities lead to higher financial performance through customer-side digitalization. Impact of supplier-side digitalization is minute but significant negative.
Ravichandran & Lertwongsatien (2005)	1. IS resources (IS human capital, IT infrastructure, and IS partnership quality) 2. IS capabilities 3. IT support for core competencies	Operating performance: 1. Profitability 2. Productivity 3. Financially exceed competitors Market-based performance: 1. Success of entering new markets 2. Success of bringing new products and services		29.5% of the variance in firm performance (operating and market) was explained by the structural model. Overall, the results support the notion that IS can improve firm performance when its capabilities are integrated with distinctive firm competencies.
Saeed, Grover & Hwang (2005)	E-commerce competence (2 variables) with 6 control variables	1. Tobin's q (Long-term) 2. EVA (short-term) measures		A direct linkage was found between EC competence and firm performance (EVA and Tobin's q). Facilitation at the requirement and ownership stages shows a significant relationship with EVA and Tobin's q, respectively. Through these two stages, customer value seems to be enhanced and thus to influence firm performance.

Table 2-2 (Continued)

Authors (Year)	Independent Variables	Dependent Variables		Findings
		Financial	Perceptual	
4. EC Capabilities (or Competencies) and firm performance				
Saini & Johnson (2005)	Three capabilities: IT, strategic flexibility, and trust-building capabilities.	1. Profitability 2. Sales growth 3. Market share 4. Return on investment	1. Number of web site visitors 2. Attraction rate 3. Conversion rate 4. Frequency of account access	Proactive market orientation enhanced IT capability on EC but not on website performance. Website performance was significantly positive related to EC performance. Strategic flexibility and trust-building capabilities, both interaction of IT and strategic flexibility capabilities and proactive market orientation, and website performance were significant on EC performance. Firm size, nature of the firm, proactive market orientation, and interaction of strategic flexibility on both proactive and responsive market orientations were significant on website performance.
Zhu & Kraemer (2004)	EC capability: 1. Information 2. Transaction 3. Interaction 4. Supplier integration IT infrastructure (LAN, PC, and IT intensity)	Performance: 1. Profitability (sales per employee and gross margin) 2. Cost reduction (cost of good sold) 3. Inventory efficiency (inventory turnover)		A significant relationship was found between EC capabilities and inventory turnover. Applying EC, traditional manufacturing companies were related with the increased cost of goods sold. A reverse relationship was found in technology firms. “This result seems to highlight the role the resource complementarities for the business value of EC” (p. 275).

Table 2-3

*Summary of Taiwan's Literature Review*

Author (year)	Findings
<b>1. Development of Online Brokerage Sector</b>	
Chang, Hwang & Ging (2000)	Online trading reduced the number of branch offices of securities firms. In addition, the availability of online stock trading has caused customers to invest stocks online.
Chen (2001)	Risks are associated with online securities trading. The need for an online security and trust mechanism is important for the sector's development. Strategic alliances, human resources, online financial services, and multi-channels will strengthen a firm's competitive advantage.
<b>2. Website Design and Firm Performance</b>	
Lin (2002)	The three most frequently presented information or functions on websites of online brokerage were communication channel, company introduction, and commercial advertisement. Further, securities firms provided abundant financial commodity information.
<b>3. Business Models and Firm Performance</b>	
Chang (2004)	Online securities sector is in the growth stage and sector leaders will continue to win. Financial structure, operating efficiency, and costs control were better for pure players than for hybrid brokers. The worst performers were the traditional brokers. Online and physical stores are perceived to be complementary rather than competitive.
Cheng (2001)	No significant differences were found among different business models in relation to financial performance. However, better financial performers showed significant differences on profit margin, unit expense, earning per share, and unit cash flow. Among the models, service providers had the highest set up costs and Internet brokers and content aggregators had the highest operating costs. Marketing expense was the highest in operating expenses, especially for the best financial performers.
Lu (2004)	A significant positive correlation was found between channel integration of "click and mortar" business model and performance measures. A negative correlation was found between channel conflict and "click and mortar" firm performance. Innovative service and new market opportunity of "click and mortar" were all significant for both performance measures.
<b>4. Key Success Factors and Firm Performance</b>	
Zhu, Ho, Tang & Chen (2003)	Learning (24.5%), efficiency (21.5%), uniqueness (18.8%), pricing (10.2%), brand (8.7%), network (6.5%), searching (6%), and cooperation (3.8%) were important for the success of Internet business. Fourteen items valued about 70% of the total amount (weight) were selected to be key success factors for online bookstores.
Lee (1999)	The top five success factors were managers' support, security, real-time investment information, quality of data transmission, and certification and legal issues of electronic file. After implementing EC, brokers improved their service image, reputation, revenues, and operating costs.

### *Theoretical Conclusions*

The theoretical literature on firm performance was based on a traditional financial model that was viewed as essential for strategic management (Wild, 1993). Based on Schendel and Patton's (1978) work, their financial model provided a clear framework in which financial results are affected by strategic management decisions of goal setting, resources allocation, and coping with external environmental constraints. Further, Capon, Farley, and Hoening (1990) proclaimed that "financial performance is in the form of measures of individual relationships in models linking various hypothesized causal variables to various performance measures" (p. 1143). Those causal variables can range from a firm's business (internal and external) environment and management strategy to organizational characteristics.

EC theories have adopted concepts from the fields of economics and strategic management. From the economics' point of view, transaction costs theory argues for transaction efficiency enhanced by EC. From the strategic management point of view, the strategic typology framework and the resource-based view are discussed, primarily to explain B2C EC factors related to firm performance.

From an economic fundamental point of view, transaction costs include searching, negotiating, monitoring, and enforcement during a market exchange (Bakos, 1997; De et al., 2001; Lee, 2001). The transaction costs model proposes that the Internet increases the efficiency of the transaction process which in turn enhances the "bottom lines" of online firms (Lee & Kim, 2002; Liang et al., 2004).

Theories of strategic typologies have recently been applied to the EC field. Both Miles and Snow (1978) and Porter (1980) proposed typologies based on the belief that

strategic processes can be simplified by seeking patterns of organizational behavior. As strategic groups help identify clusters of businesses with similar strategies, EC scholars have utilized strategy typologies as a theoretical basis to categorize and examine strategic groups in relation to firm performance (Grover & Saeed, 2004; Kim et al., 2004; Saini & Johnson, 2002).

Miles and Snow (1978) offered a theoretical framework, an integrated dynamic system that interrelates organizational strategy, structure, and process, to align with organizational environment. In particular, the framework emphasizes an adaptive cycle, dealing with and solving entrepreneurial, engineering, and administrative problems. EC firms operate in an environment that requires adaptive capabilities (McKee, Varadarajan, & Pride, 1989; Saini & Johnson, 2002). Among the four strategy types (prospector, analyzer, defender, and reactor), prospector firms tend to have the highest level of adaptive capabilities (McKee et al., 1989; Saini & Johnson, 2002). The Miles and Snow typology (1978) proposed that prospectors, analyzers, and defenders outperform reactors. However, Saini & Johnson (2002) used the Miles and Snow strategic typology framework and proposed that prospectors had higher performance levels than did analyzers, defenders, and reactors in B2C EC firms.

Porter (1980) claimed that firm profitability is determined by how lucrative the industry is that a company is in and how a company is positioned in relation to its competitors in that industry. Porter proposed that using one (pure strategy) generic strategy produced superior performance, compared to using a mixed or hybrid strategy. However, when applied to B2C EC Porter's generic strategies resulted in a hybrid cost

leadership-differentiation strategy that outperformed the cost leadership strategy (Kim, et al., 2004).

Critiques of strategy typologies have focused on their lack of consideration of the unique idiosyncratic resources at the individual firm level (Barney & Hoskisson, 1990). Similarly, Porter's generic strategy has been criticized for its emphasis on industry structure to determine firm performance (Fahy & Smithee, 1999). As a result, strategists have moved their attention to firm-level resources, such as the resource-based view (RBV). Further, both generic strategy groups have proposed that a pure strategy is associated with superior performance. However, empirical studies found that a mixed strategy outperformed pure strategies (Hlavacka et al., 2001; Kim et al., 2004; Marlin & Huonker, 2004; Saini & Johnson, 2002; Spanos et al., 2004).

Based on this combination strategy debate, Parnell (2002) reconceptualized strategy theory by integrating a business strategy typology (industry effect) with the resource-based view (organization effect) for application to the "New Economy." Parnell (2002) proposed that a combination strategy with a competitive advantage of synergistic innovation from firm resources of culture of change, flexibility, and efficiency, speed, technological leadership, and marketing expertise has a greater effect on firm performance than does any pure strategy.

In terms of strategic management, differences in performance across businesses can be attributed to both industry (external) and organization (internal) effects (Rumelt, 1991). However, the weakness of the resource-based view is its static nature that does not take the dynamic aspect of the resource development process into consideration in an uncertain and rapid changing environment, in particular in EC development (Eisenhardt

& Martin, 2000; Teece et al., 1997; Zhu & Kraemer, 2002). Perhaps, a further refinement of the modified competitive strategy framework to integrate with the dynamic capabilities perspective is needed.

Barney (1991) proclaimed that strategic resources are heterogeneous and immobile among firms in an industry (or group) and that the unique assets and capabilities of some firms allow them to sustain a competitive advantage. Thus, the RBV model proposes that strategic choices by a firm's top management to identify, develop (or create), and deploy unique resources and capabilities can indeed maximize and attain above average returns (Peteraf, 1993; Teece et al., 1997). The RBV model has been applied to EC to examine EC capabilities regarding firm performance (Barua et al., 2005; Barua et al., 2004; Zhu & Kraemer, 2002) and B2C EC firms (Auger, 2003; Colton, 2004; Saeed et al., 2005).

The resource-based view has been used in information system (IS) literature "to explain how firms can create a competitive advantage from IT assets and how sustainability resides more in the organization's skills to leverage IT than in the technology itself" (Zhu & Kraemer, 2002, p. 277). Refining the concept of RBV, Teece, Pisano, Shuen (1997) proposed that the dynamic capabilities framework "analyzes the sources and methods of wealth creation and capture by private enterprise firms operation in environments of rapid technological change" (p. 509). Zahra and George (2002) further proposed that the interplay of strategy, IS, and entrepreneurship can create a competitive advantage. Zhu and Kraemer (2002) conducted an empirical study based on RBV and the dynamic capabilities perspective to assess the value of EC when treating

website design features as EC capabilities that can enhance business value. A similar treatment is found in Auger's study (2003).

Critiques of the RBV are based mainly on its static view that does not take the dynamic nature of the resource development process into consideration in an uncertain and rapid changing environment. Ambiguity regarding the RBV theory has been caused by inconsistent and conflicting use of terminology in describing a firm's resources, such as core competency and capabilities being interchangeable (Fahy & Smithee, 1999). Further, Collis (1994) recognized that capabilities are likely to be surpassed by a higher order or a stronger capability that can lead to the problem of infinite regress. Theories in strategic management coincide with Schendel and Patton's (1978) financial model of the firm that reflects three strategic decisions, namely the goals of the firm (generally profit-oriented), the available means or a firm's resources allocations (internal variables) that relate to RBV, and environmental constraints (external variables) that are associated with the strategic typology framework.

Website design features have been perceived as EC capabilities in the RBV model (Zhu & Kraemer, 2002), and website design capabilities were found to be a significant factor that influenced firm performance (Auger, 2003; Zhu & Kraemer, 2002). In contrast, scholars in the field of website design have utilized interactivity and usability concepts to explain the impact of website design on firm performance or website performance (Auger, 2005; Dholakia et al., 2001; Dubelaar et al., 2003, Palmer, 2002). How interactive and useful a website design is becomes essential for commercial website success. Auger's model (2005) proposed that a more interactive website has a positive



relationship to firm performance. Palmer (2002) proposed a theoretical framework that states that the higher the level of usability, the better the firm performance.

Both concepts have been criticized for their inconsistent definitions and also their different perspectives from the interpersonal, mechanical, and engineering approaches (Coyle & Thorson, 2001; Ha & James, 1998; Nielsen, 2003; Palmer, 2002; Sicilia et al., 2005). These two concepts have identified and recognized similar website design features (or characteristics); in addition, several empirical studies without the two theoretical frameworks have also identified the same website features (Auger, 2005; Brinck & Hand, 1998; Karayanni & Baltas, 2003; Lii et al., 2004; Palmer, 2002; Tarafdar & Zhang, 2005a; Tarafdar & Zhang, 2005b; Udo & Marquis, 2001). As a result, the two concepts should be refined or integrated to more clearly explain the impact of website design features on firm performance.

### ***Empirical Conclusions***

Various financial and perceptual (non-financial) measures were developed and used in the different studies. Most of the measures were not integrated (Motiwalla et al., 2005; Rajgopal et al., 2001; Yang et al., 2003; Zhuang & Lederer, 2004) and not multidimensional to include financial and perceptual measures (Graham et al., 2002; Lai & Wong, 2005; Liang et al., 2004; Lu, 2004; Motiwalla et al., 2005; Ranganathan & Grandon, 2002; Saeed et al., 2005; Sung & Gibson, 2005). In addition, two studies used Tobin's  $q$  as long- and short-term financial measures (Saeed et al., 2005; Sung & Gibson, 2005). The difficulty of integrating financial and non-financial measures is caused by web-based measures that have a relatively short history and thus cannot provide sufficient data (Epstein, 2004; Garbi, 2002; Wang et al., 2002; Yang et al., 2003). However, sales

growth rate has been one of the most accepted B2C EC financial measures (Auger, 2005; Kim et al., 2004; Saini & Johnson, 2002; Saini & Johnson, 2005; Zhuang & Lederer, 2004) and market share was used for e-brokerage firms (Saini & Johnson, 2005).

In addition, measures for B2C EC factors are incongruent and scholars have evaluated B2C EC factors in many different ways. CEO commitment (Zhuang & Lederer, 2004), strategy types (Kim et al., 2004; Lai & Wong, 2005), website design (Auger, 2005; Lee & Kim, 2002; Ranganathan & Grandon, 2002; Zhuang & Lederer, 2004), and EC capabilities (or competencies) (Barua et al., 2004; Saeed et al., 2005; Saini & Johnson, 2005) were all discussed separately in studies.

Miles and Snow's (1978) strategic typology was measured by Snow and Hrebiniak (1980), using a self-typing descriptive paragraph to identify four different strategy types (prospector, analyzer, defender, and reactor). An index of the concentration of interrater reliability for nominal categories was assessed with an average of 0.52, but ranging from .30 to .76. Further, validity of the typology was assessed by Shortell and Zajac (1990), using Duncan's multiple range tests to verify predictive validity. Thus, the measurement of the typology was validated but its reliability was only partially supported.

CEO commitment and EC website features were measured by Zhuang and Lederer (2004) based on work originally developed by Powell and Dent-Micallef (1997) to assess IT. Accordingly, Zhuang and Lederer (2004) revised their instrument to be applied in a B2C EC context. Composite reliabilities of CEO commitment and EC website features were evaluated, and all constructs met the minimum accepted level of .60. Convergent and discriminant validities were also established.

The empirical literature on the impact of B2C EC factors on firm performance is generally positive. However, some measures that were found to be positive in one study might not be positive in another study due to the methodological design of the study (Kim et al., 2004; Lai & Wong, 2005; Rajgopal et al., 2001; Yang et al., 2003). The empirical studies have nonetheless pointed to the need of seeking other factors, such as CEO commitment or top manager support (Epstein, 2005; Huizingh, 2002; Kuo, 2003; Lee, 1999; Yang et al., 2002; Zhuang & Lederer, 2004) and capability of organizational learning and knowledge (Saini & Johnson, 2005) to support and strengthen the existing findings.

Some empirical studies that used either a relatively small sample size (Garbi, 2002; Kim et al., 2004; Liang et al., 2004; Lee & Kim, 2002; Lu, 2004; Yang et al., 2003) or that received a low response rate (Auger, 2005; Zhuang & Lederer, 2004) need further replication. An extension of the research to other countries is also suggested (Kim et al., 2004; Lai & Wong, 2005; Lee & Kim, 2002; Sung & Gibson, 2005).

Taiwan's literature has only focused on business models for firm performance (Chang, 2004; Cheng, 2001; Lu, 2004). Few studies have investigated the development of the online securities sector (Chang et al., 2000; Chen, 2001). Other factors, such as website content and the key success factor, were also examined in the online brokerage sector (Lee, 1999; Lin, 2002; Zhu et al., 2003). However, B2C EC attributes for firm performance, apart from the B2C EC business model, were rarely empirically tested in Taiwan. Thus, future research should incorporate important B2C EC factors, such as CEO commitment, strategy, and website design and IT system integration capabilities, relative to firm performance in Taiwan's online brokerage sector.

A larger sample that focuses on a single industry should also be employed to validate previous empirical research (Lee & Kim, 2002; Lu, 2004; Yang et al., 2003; Zhu et al., 2003). Intervening factors, such as firm size and Web age, might influence firm performance and thus should be incorporated into future studies (Auger, 2005; Saeed et al., 2005; Saini & Johnson, 2002).

Scholars have found that CEO commitment, website design features, EC capabilities, and strategy types are the major contributors to firm performance (Auger, 2005; Barua et al., 2004; Epstein, 2005; Graham et al., 2002; Huizingh, 2002; Karayanni & Baltas, 2003; Lee, 1999; Lee & Kim, 2002; Liang et al., 2004; Lohse & Spiller, 1999; Oetzel, 2004; Ranganathan & Grandon, 2002; Saeed et al., 2005; Saini & Johnson, 2002; Saini & Johnson, 2005; Sung & Gibson, 2005; Zhuang & Lederer, 2004). However, these B2C EC factors were all investigated separately to explain effects on firm performance and there is a strong need to combine these factors to better explain B2C EC firm performance.

There are few empirical studies on the causal relationship between B2C EC factors and firm performance. Thus, multivariate causal modeling should be conducted to examine the causal relationships between B2C EC factors and firm performance. As a whole, the empirical literature does support that B2C EC factors have a positive impact on firm performance.

### ***Theoretical Recommendations***

From the extensive literature review undertaken as a basis for this proposal, areas of future inquiry have been identified. Theories of strategies have taken different approaches and used internal and external factors to explain firm performance. The

generic strategies of Miles and Snow (1978) and Porter's (1980) typology frameworks tend to focus on analyses of the external environment and its influence on firm performance (Barney & Hoskisson, 1990; Fahy & Smithee, 1999). In contrast, strategists of the resource-based view and the dynamic capabilities perspective have proposed that internal firm-level resources and capabilities are critical factors in accurately explaining firm performance (Barney, 1991; Teece et al., 1997; Wheeler, 2002; Zhu & Kraemer, 2002). Taking only a one-sided view, either internal or external, is not the best approach to explain firm performance.

Rumelt (1991) stated that performance variation across firms is attributed to both internal and external factors. Thus, both the strategic typology framework and the resource-based view should be integrated to explain firm performance. As a result, Parnell (2002) proposed that a modified competitive advantage typology should integrate strategic typology with the resource-based view for the "New Economy." As EC is distinguished for its expedited change and evolution, Miles and Snow's (1978) strategic typology framework should be integrated with the dynamic capabilities perspective as these two models are better internal and external explainers of performance for B2C EC firms that are dealing with a rapidly changing environment (Saini & Johnson, 2002; Zhu & Kraemer, 2002)

### ***Empirical Recommendations***

Empirical studies are needed to understand the impact of B2C EC factors on corporate performance. Future empirical studies should focus on integrative approaches comprised of essential EC factors, such as CEO commitment, website design and system integration (IT) capabilities, and strategy types, to more precisely explain the impact of

B2C factors on firm performance. Previous studies found that CEO commitment to EC did affect website design features and firm performance (Zhuang & Lederer, 2004). EC capabilities in integrating IT systems indicated a positive effect on firm performance (Barua et al., 2004; Ravichandran & Lertwongsatien, 2005; Saeed et al., 2005; Saini & Johnson, 2005; Zhu & Kraemer, 2002). In addition, empirical studies showed that strategy types explained the different levels of B2C EC firm performance (Saini & Johnson, 2002).

However, past empirical studies were conducted to explain B2C EC factors separately on firm performance from either internal (firm-level) or external (industry-level) analyses. No studies were found that examined CEO commitment, website design and IT system integration capabilities, and strategy type in a single study to explain B2C EC firm's online sales growth rate and online market share. Therefore, an integrative approach that combines CEO commitment, website design and IT system integration capabilities, and strategy types and is guided by the resource-based view of the dynamic capabilities perspective and the strategic typology of Miles and Snow (1978) in a typology framework is necessary an appropriate to explain these B2C EC factors and their effect on firm performance.

Several empirical studies point to the need of combining web-based and financial measures as firm performance indicators whenever possible (Garbi, 2002; Motiwalla et al., 2005; Saeed et al., 2005). In addition, a larger sample that focuses on a single industry should be employed to validate the prior empirical research (Lee & Kim, 2002; Lu, 2004; Yang et al., 2003). Contextual factors, such as firm size and Web age, are found to have influence on firm performance and should be included in future study

(Auger, 2005; Saeed et al., 2005; Saini & Johnson, 2002). As there are few empirical studies on the causal relationship between B2C EC factors and firm performance, multivariate causal modeling should be conducted to examine the causal relationships between B2C EC factors and firm performance.

The rationale of choosing the online brokerage sector was that its industry offers financial products and information that can be digitalized and sold online instantly (Dubelaar, Tsarenko, Gabbott, 2003; Lee & Kim, 2002; Lin, 2002; Oetzel, 2004). The online brokerage sector is an indicator of the Internet's success in the U.S. and Taiwan (Chang, 2004; Chang et al., 2000; Saini & Johnson, 2005). In addition, online brokerage is Taiwan's second largest sector in terms of online market scale and the only sector that has enjoyed significant growth in Taiwan (Department of Commerce, 2005).

On the whole, the empirical literature supported the idea that EC factors have a positive impact on firm performance. However, no study has integrated CEO commitment, website design and IT system integration capabilities, and strategy type to explain B2C EC firm performance. Thus, this study proposed an integrated theoretical framework that leads to a research question and hypotheses.

### **Theoretical Framework for the Study**

Based on the critical analysis of theoretical and empirical review, performance variation of firms is attributed to firm-specific (internal) and industry (external) effects (Rumelt, 1991). Thus, this study proposed an integrated approach of combining Miles and Snow's (1978) typology framework (industry effect) and resource-based view of the dynamic capabilities perspective (firm-level effect) to better explain B2C EC firm performance.

In addition, a review of empirical studies found no research that examined CEO commitment, strategy types, website design and IT system integration capabilities in a single study to explain their impact on firm performance. Separately, all these B2C EC factors have been found to have positive impacts on firm performance (Auger, 2005; Barua et al., 2004; Epstein, 2005; Graham et al., 2002; Huizingh, 2002; Karayanni & Baltas, 2003; Lee, 1999; Lee & Kim, 2002; Liang et al., 2004; Lohse & Spiller, 1999; Oetzel, 2004; Ranganathan & Grandon, 2002; Ravichandran & Lertwongsatien, 2005; Saeed et al., 2005; Saini & Johnson, 2005; Sung & Gibson, 2005; Zhu & Kraemer, 2002; Zhuang & Lederer, 2004). A theoretical framework is displayed in Figure 2-2 that shows the relationships among these variables.

The resource-based view of the dynamic capabilities perspective developed by Teece et al. (1997) stresses that integrating a firm's resources and capabilities create competitive advantages that will lead to superior returns. Scholars have perceived EC as a new strategy and a new capability to gain a competitive advantage through value creation (Aguer, 2003; Barua et al., 2004; Chang et al., 2002; Ravichandran & Lertwongsatien, 2005; Rayport & Sviokla, 1995; Saeed et al., 2005; Wang et al., 2002; Yeung & Lu, 2004; Zhu & Kraemer, 2002). Value creation is based on the Internet's ability to add value to online shoppers, through online trading, new products and services, and information (Oetzel, 2004) that is made possible by IT system integration throughout the value chain (Barua et al., 2004; Ravichandran & Lertwongsatien, 2005; Zhu & Kraemer, 2002). In addition, Zhu and Kraemer (2002) perceived EC website features as EC capabilities for commercial application that will offer a competitive advantage and generate profits (Auger, 2003; Cohan, 2000; Kim et al., 2004; Oetzel, 2004). Thus, the



RBV of the dynamic capabilities perspective model proposes that EC capabilities of website features and IT system integration can have a positive effect on firm performance.

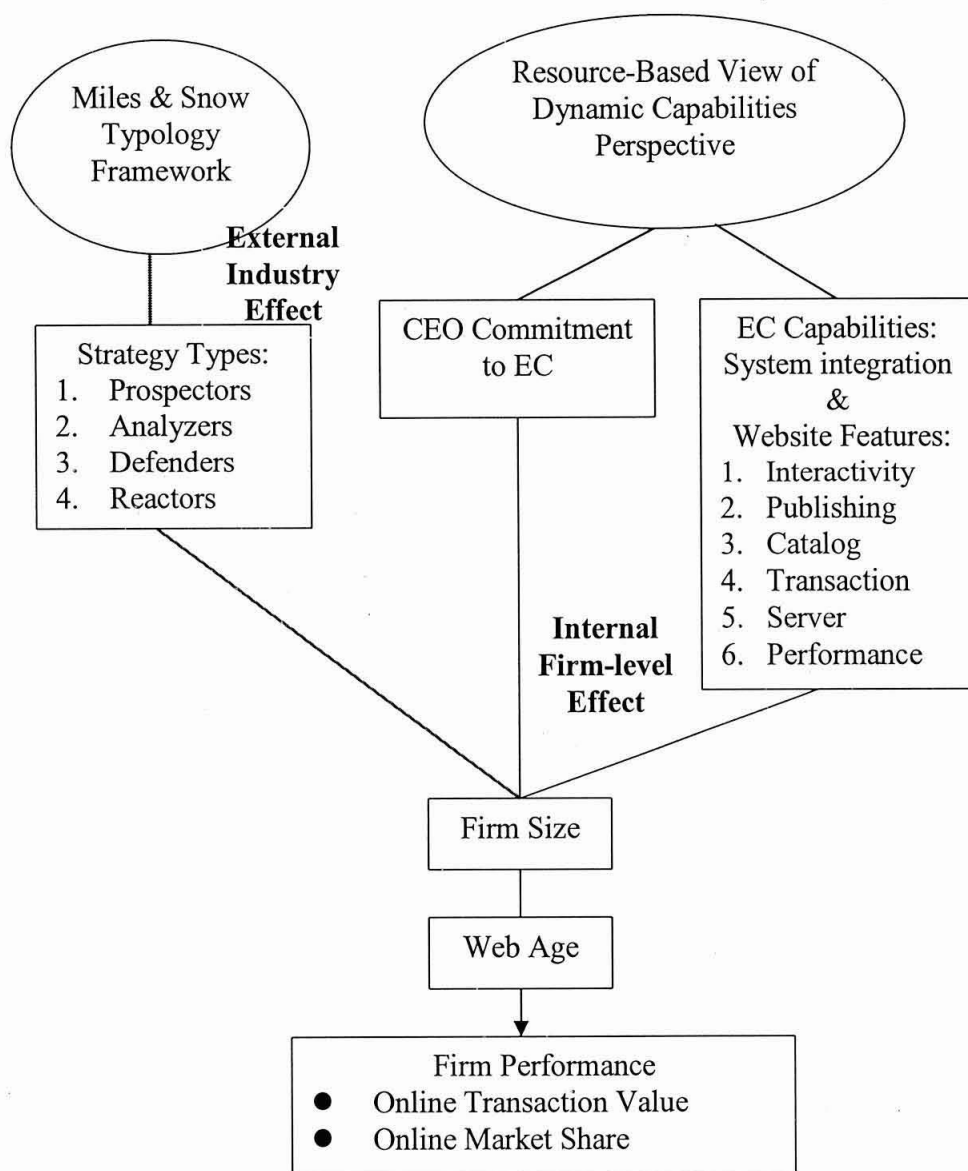


Figure 2-2: A comprehensive model of B2C factors in explaining firm performance.

In general, CEOs or top managers have the decision making power to make resource allocation (tangible and intangible). As a result, top management commitment

in allocating firm resources to B2C EC capabilities is crucial for success (Epstein, 2005; Hughes & Stone, 2002; Huizingh, 2002; Kuo, 2003; Lee, 1999; Yang et al., 2002; Zhuang & Lederer, 2004). Based on the resource-base view of the dynamic capabilities perspective, this study proposed that CEO commitment to B2C EC capabilities is positively related to firm performance.

In addition, a strategy framework based on Miles and Snow's (1978) strategic typology identifies firm strategy types that have different ways of dealing with external environmental changes that can result in different firm performance. Prospectors are the first to see opportunities and adapt to environmental changes. In the virtual world, dynamic environmental changes are expected. According to Miles and Snow, strategic typology proposes that generic strategies (prospectors, defenders, and analyzers) outperform reactors in firm performance (Aragon-Sanchez & Sanchez-Martin, 2005; Garrigos-Smith et al., 2005; Gibbons et al., 2003; Saini & Johnson, 2002).

The financial model developed by Schendel and Patton (1978) stated that financial results are affected by strategic management decisions, resource allocation (internal), and coping with external environment constraints (external). Thus, B2C EC strategic management decisions, top management commitment as a way of allocating resources to EC, website design and IT system integration capabilities, and strategy type (dealing with external environment indirectly) are significant explanatory variables of financial performance (growth rates of online sales and online market share) in e-brokerage firms in Taiwan.

This study also included firm size and Web age as contextual variables. Strategic management and EC research have suggested that firm size has been an important factor

in the strategy-performance relationship (Auger, 2005; Saini & Johnson, 2002). A similar rationale was applied to Web age. Firms that launched their websites earlier are likely to enjoy first-mover advantage (Auger, 2005; Saini & Johnson, 2002). Together, firm size and Web age are two positive factors that influence firm performance.

### **Research Question**

1. What are the socio-demographic characteristics of top managers, organizational characteristics (firm size and Web age), CEO commitment, strategy types, website design, IT system integration capabilities, and firm performance of e-brokerage firms in Taiwan?

### **Research Hypotheses**

Miles and Snow (1978) strategic typology proposes that prospectors, analyzers, and defenders are viable strategic types that are likely to outperform reactors in “brick and mortar”. However, findings in B2C EC suggest that prospectors are likely to outperform other strategy types (Saini & Johnson, 2002). Thus, these two sets of hypotheses were proposed in this study.

H1: Taiwanese e-broker firms whose top managers report using prospector, analyzer, and defender type strategies have significantly higher online sales than Taiwanese e-broker firms whose top managers report using reactor strategies.

H2: Taiwanese e-broker firms whose top managers report using prospector, analyzer, and defender type strategies have a significantly higher online market share than Taiwanese e-broker firms whose top managers report using reactor strategies.

H3: Taiwanese e-broker firms whose top managers report using prospector type strategies have significantly higher online sales than Taiwanese e-broker firms whose top managers report using analyzer, defender, and reactor strategies.

H4: Taiwanese e-broker firms whose top managers report using prospector type strategies have a significantly higher online market share than Taiwanese e-broker firms whose top managers report using analyzer, defender, and reactor strategies.

H5: There is a significant positive relationship between Taiwanese top manager perceptions of CEO commitment, strategy types, website design, IT system integration capabilities, firm size, Web age, characteristics of top managers, and online sales in Taiwan e-brokerage firms.

H6: There is a significant positive relationship between Taiwanese top manager perceptions of CEO commitment, strategy types, website design, IT system integration capabilities, firm size, Web age, characteristics of top managers, and online market share in Taiwan e-brokerage firms.

Chapter II reviewed the major applied EC theories, and concepts and B2C EC attributes. Critical analyses of theoretical and empirical literature led to the discovery of a literature gap that no integrative approach combined CEO commitment, strategy types, website design and IT system integration capabilities in a single study. The literature gap provided a direction for a further empirical study. Consequently, the research question and hypotheses for this study were derived to test specific propositions. Chapter III

presents the precise research methodology for this study of the impact of B2C EC factors on firm performance in Taiwan's e-brokerage firms.

## **CHAPTER III**

### **RESEARCH METHODS**

Chapter III presents the methodology that was used to answer the research question and analyze the hypotheses that investigated relationships among CEO commitment to EC, strategy types, website design, IT system integration capabilities, and firm performance in Taiwan's online brokerage sector. There are six sections to this chapter:

1. Research design: A research method was discussed and independent and dependent variables were identified.
2. Population and sampling: A target and accessible population were defined and a sample was drawn.
3. Instrumentation: Questionnaires were described and their reliability and validity were provided.
4. Procedures: Methods of data collection and ethical considerations were included.
5. Data Analysis: This section described the statistical procedures, including exploratory data analysis, internal consistency reliability, exploratory factor analysis, descriptive analysis, one-way ANOVA and hierarchical multiple regression.
6. Evaluation of research methods: Strengths and weaknesses of the research method were evaluated.

## Research Design

A quantitative, non-experimental, correlational (explanatory), and causal-comparative (exploratory) survey and secondary data research design was applied to assess the relationships among CEO commitment, strategy types, website design and IT system integration capabilities on firm performance in Taiwan. The survey instrument contained questions on organizational characteristics, top managers' profiles, CEO commitment, strategy types, website design, and IT system integration capabilities.

A two-stage (phone and mail) survey was used to collect data from the entire target population of 61 e-broker firms for firm performance (secondary data). Further, responses from 440 top managers from these 61 e-brokerage firms in Taiwan were obtained. The dependent variable (financial indicators of firm performance) was measured, using a secondary analysis of objective annual online sales and online market share data from the Taiwan Stock Exchange (TSE) for the period between July 2005 and June 2006.

Top division-head managers of e-brokerage firms and their assistant managers were invited to participate in the six-part survey. Part 1 addressed the organizational characteristics of e-brokerage firms (firm size, and Web age), and was measured by the *Organizational Characteristics Profile*, developed by the researcher. Part 2 included the sociodemographic characteristics of top managers (gender, age, education, and tenure), and was measured by the *Top Managers' Profile* developed by the researcher. Part 3 measured strategy types, using Snow and Hrebiniak's (1980) *Strategic Typology Survey*. Part 4 addressed CEO commitment and was measured by *CEO Commitment to EC Questionnaire* (Zhuang & Lederer, 2004). Part 5 assessed the EC capability of website

design using *EC Site Features*, developed by Zhuang and Lederer (2004). Part 6 measured IT system integration capability, developed by the researcher.

Frequency distributions, measures of central tendency, and variations were utilized to describe all the variables that answered the research question. For hypotheses testing, ANOVA with post hoc comparisons was used to compare the differences in the two measures of financial performance according to strategy types (Hypotheses 1- 4). Hierarchical multiple regression was used to examine the explanatory relationships between the independent variables (CEO commitment, strategy type, website design, IT system integration capabilities, top managers' characteristics, organizational characteristics) and the dependent variables of online sales and market share annual growth rates (Hypotheses 5-6).

## **Population and Sampling**

### ***Target Population***

The target population is the one to which the research findings are to be generalized (Lunsford & Lunsford, 1995). In this study, the target population consisted of e-brokerage firms in Taiwan that conduct transactions over the Internet. In February 2006, there were approximately 61 online securities brokerage firms (Trading Department of Taiwan Stock Exchange, 2006). In this study, the 61 online brokerage firms were the target population. They provided the basis for performance data, obtained through secondary analysis.

In addition, top managers from these 61 e-brokerage firms were also a target population. In general, top managers should have frequent contact with CEOs in order to have ideas about CEO commitment to EC, corporate strategy types, website design, and



IT system integration capabilities. Thus, the top managers eligible for this study would be those who were division head managers and assistants to division head managers, one and two levels down from the CEO's.

According to the organizational structure of e-brokerage firms, the divisions of EC, brokerage, investment banking, fixed-income, underwriting, future trading, derivatives, and international business are generally identified in larger online securities firms (Capital Securities, 2004; China Trust Securities, 2006; Polaris Securities, 2006; Yuanta Securities, 2005). Divisions of EC and brokerage are usually also identified in smaller companies (Fullong Securities, 2005; Pacific Securities, 2006; Yong Shin Securities, 2005). Division heads and their assistant managers, who are one and two levels down from the CEOs, are defined as the top managers. These managers are the appropriate target population, as they have frequent contact with CEO's and are knowledgeable about the firm's strategy, resources, and capabilities. By reviewing the websites of 61 online brokerage firms, this study identified 440 appropriate division head managers and assistant managers.

### ***Accessible Population***

The accessible population of 440 division head managers and their assistant managers was the same as the target population. The firm performance data of the 61 online brokerage firms was derived from secondary data sources.

### ***Sampling and Setting***

For firm performance of online sales and market share (secondary analysis of data), the entire target population of e-brokerage firms in Taiwan constituted the final data producing sample (N=61) (Trading Department of Taiwan Stock Exchange, 2006).

The entire population of top managers of e-brokerage firms in Taiwan (N=440) was invited to participate in the survey. For top managers, the final data producing sample was a self-selected sample of those top managers that agreed to participate in this study.

A complete target population list was downloaded from the Taiwan Stock Exchange and Taiwan Securities Association websites. Data were collected using the target population list, including securities firm website addresses and contact numbers. A four-step procedure was used to ensure a high response rate. First, a phone call was placed to all top managers knowledgeable about corporate strategy or responsible for online trading. In this call, the researcher explained the purpose of the study and invited all top managers to participate. Second, mailed information was offered to top managers who did not feel comfortable making a commitment to participate in the study over the phone and then they received a follow-up call to determine whether or not they planned to participate. Third, a postage-stamped envelope with the survey and consent form was mailed to the top managers who agreed to take part in the study. Fourth, a follow-up, reminder phone call was made to the top managers who had agreed to participate, but who had not returned the survey by a given date.

In general, a larger sample size not only enhances generalizability to the accessible population but also minimize sampling errors. However, various rules of thumb about sample size are used. VanVoorhis and Morgan (2002) provided a general rule for an appropriate sample size in examining associations and suggested approximately 30 participants per predictor variable in order to detect a small effect size. In this study, eight predictor variables (CEO commitment, strategy type, website design with five sub-constructs, and IT system integration) were examined. Thus, the

appropriate sample size was determined to be around 240. In addition, Hair, Anderson, Tatham, and Black (1998) stated that the minimum sample size for factor analysis is at least five times the number of observed variables. In this study, a total of 23 observed variables were included, and thus a sample size of 105 was deemed appropriate. The number of top managers who agreed to participate in this study was 166, and the number of valid surveys was 159. Thus, the sample size in this study met the minimum requirement. The research setting for the data collection of top manager perceptions was online brokerage firms in Taiwan.

### ***Eligibility Criteria***

The focus of this study was firm performance, based on the secondary analysis of data and perceptions of top managers with knowledge of CEO commitment, corporate strategy, website design, and IT system integration capabilities in Taiwan's e-brokerage firms. The following eligibility and exclusion criteria applied to the study:

1. The geographic area and setting of the sampling plan in this study were limited to Taiwan.
2. The target population was restricted to online securities brokers who provided full-function online transactions and who reported their transaction data to the Taiwan Stock Exchange (for data consistency).
3. Participants had to be top managers (division head managers and assistants to the division head managers, one and two levels down the CEOs).
4. Participants had to be 18 years old or older.
5. Participants had to be able to speak, read, and write Mandarin.

### ***Exclusion Criteria***

The following were excluded from participation in this study, as related to setting and participant characteristics:

1. Top managers who did not work for Taiwan's e-brokerage firms.
2. Online securities brokers who did not provide full-function online transactions and who did not report their transaction data to the Taiwan Stock Exchange.
3. Online securities brokers who were not top managers (division head managers and assistants to division head managers, one and two levels down from the Chief Executive Officers).
4. Potential participants who were not 18 years old or older.
5. Potential participants who were not able to speak, read, and write Mandarin.

### **Instrumentation**

A six-part questionnaire was used in this study. These parts dealt, respectively, with organizational characteristics, top managers' profile, CEO commitment, strategy types, website design, and IT system integration capabilities (see Appendix E). A summary of the total 33 items used in the instrument appears in Table 3-1.

#### ***Part 1: Organizational Characteristics Profile***

The organizational characteristics profile of online brokerage firms in Taiwan consisted of two items; firm size and Web age (see Appendix E, Part 1). Firm size was determined by the number of employees, and Web age was defined by the number of months operating commercially on the Internet.

Table 3-1

*Constructs of the Questionnaire*

<b>Part</b>	<b>Name</b>	<b>Questionnaire Developers</b>	<b>Items</b>
1	Organizational characteristics profile	The researcher	2
2	Top managers' profile	The researcher	4
3	CEO commitment to EC	Powell & Dent-Wicallef (1997) and Zhuang & Lederer (2004)	3
4	Strategy types	Snow & Hrebiniak (1980)	4
5	Website design	Zhuang & Lederer (2004)	19
6	IT system integration capability	The researcher	1

***Part 2: Top Managers' Profile***

The profile of top managers contained four items developed by the researcher. The four items were gender, age, education level, and tenure in the Taiwan online brokerage firms (see Appendix E, Part 2).

***Part 3: Miles and Snow's Typology******Description***

Miles and Snow (1978) explained that strategy is a pattern of an organization's critical decisions and actions. Their strategic typology consists of prospectors, defenders, analyzers, and reactors. On the one hand, prospectors are constantly in search of market opportunities and are usually the first to respond to emerging markets. On the other hand, defenders serve in a narrow product-market environment and focus on improving operational efficiency. Analyzers try to balance operational efficiency with rapid response to markets. Finally, reactors are the ones that are forced to respond to environmental changes. Measurements of these strategy types were developed by Snow

and Hrebiniak (1980). They took a categorical approach to four descriptive paragraphs that represent the four strategy types (see Appendix E, Part 3).

In this study, top managers of Taiwan's e-brokers were asked to select the descriptive paragraph (unlabeled strategic types) closest to their firm's strategy. They were informed that no strategy type was better or worse than any other (superior or inferior). The measure is outlined in Table 3-2 with permission (see Appendix H).

Table 3-2

*Miles and Snow's Strategic Typology Survey*

Strategy Types	Operationalization
<b>Prospector</b>	This firm operates within a broad product-market domain that undergoes periodic redefinition; the firm values being "first in" new product and market areas even if not all of these efforts prove highly profitable. The firm responds rapidly to early signals concerning areas of opportunity, and these responses often lead to a new round of competitive actions. However, this type of firm may not maintain market strength in every area it enters.
<b>Defender</b>	The firm attempts to locate and maintain a secure niche in a relatively stable product area. The firm tends to offer a more limited range of products than its competitors, and tries to protect its domain by offering high quality, superior service, lower prices and so forth. Often, this type of firm is not at the forefront of developments in the industry – it tends to resist industry changes that have no direct influence on current areas of operations and concentrates instead on doing the best possible job in a limited area.
<b>Analyzer</b>	This firm attempts to maintain a stable, limited line of products, while moving quickly to follow more promising new developments in the industry. The firm is seldom "first in" with new products. However, by carefully monitoring the actions of major competitors in areas compatible with its stable product-market base, the firm can frequently be "second in" with a more cost-efficient product.
<b>Reactor</b>	This firm does not appear to have a consistent product-market orientation. The firm is usually not as aggressive in maintaining established products and markets as some of its competitors, nor is it willing to take as many risks as other competitors. Rather, the firm responds in those areas where it is forced to by environmental pressures.

*Note.* From "Strategy, distinctive competence, and organizational performance," by C. C. Snow and D. C. Hrebiniak, 1980, *Administrative Science Quarterly*, 25(2), p. 327. Copyright 1980 by Snow and Hrebiniak. Adapted with permission.

### ***Reliability and Validity***

Miles and Snow's (1978) typology was psychometrically assessed by Shortell and Zajac (1990). An index of concentration of interrater reliability for nominal categories was utilized and the average concentration ratings were 0.52, with a range of .30 to .76. In addition, Snow and Hambrick (1980) used expert raters to test interrater reliability, which ranged from .49 to .76. Therefore, the interrater and expert rater reliabilities of Miles and Snow strategic typology were weak and moderately supported, respectively.

Shortell and Zajac (1990) used Duncan's multiple range tests to establish validity. The test found significant predicted differences in 25 out of 26 cases. Thus, the predictive validity of the self-typing Miles and Snow's typology was established. To support Shortell and Zajac (1990), James and Hattten (1995) validated the instrument's convergent validity using discriminant analysis (to see comparability of the analysis and holdout sub-samples). Overall, estimates of reliability of the instrument were moderately supported and the construct validity of the instrument was established.

### ***Part 4: CEO Commitment to EC***

#### ***Description***

CEO commitment to EC refers to the level of committing passion and resources in EC. This part of the questionnaire included three items to measure CEO commitment to EC, developed by Powell and Dent-Wicalllef's (1997), and further revised by Zhuang and Lederer (2004) (see Appendix E, Part 4). To measure CEO commitment, a 5-point Likert scale with three items was used and the answers ranged from "strongly disagree" (1) to "strongly agree" (5). To build a successful website, CEOs (top managers) must make a wise allocation of firm resources (Karayanni & Baltas, 2003; Lohse & Spiler,

1999; Zhuang & Lederer, 2004). Top managers were asked to rate their responses from 1-5 on the three questions to explain their perceptions of the CEO's commitment to EC.

Table 3-3

*CEO Commitment to EC Questionnaire*

<b>CEO Commitment to EC</b>
Our top executives have clearly indicated their commitment to <i>EC</i>
Our top executives have championed e-commerce within the company
Our top executives have shown that <i>EC</i> is important to the company

***Reliability and Validity***

Reliability estimates measure the internal consistency of items in a construct over time (Trochim, 2002). In the study conducted by Powell and Dent-Micallef (1997), the Cronbach's coefficient alpha was provided as an estimate of reliability but validity was not assessed. CEO commitment had a very high Cronbach's alpha (0.92), indicating a high level of internal consistency. However, one item was added by Zhuang and Lederer (2004). Convergent and discriminant validity were both assessed and established. The reliability of Cronbach's alphas exceeded the minimum level of .70. Thus, the instrument of CEO commitment to EC is valid and internally consistent.

***Part 5: Website Design Capability***

***Description***

Website design capabilities consist of six dimensions (or characteristics). This study adopted Zhuang and Lederer's (2004) questionnaire. The first dimension is interactivity and refers to a site that is user friendly (fast responses to customers). Second



is transaction application, which allows online customers to conduct transactions with security and order tracking. Third is catalog application, which provides information about products and services. Fourth is the interface (personalization), which refers to ease of navigation and customization to tailor information to meet individual user's needs. Fifth is publishing application, which provides the company policy and information to create customer trust. Six is server performance, which refers to a site's download speed and frequent system crash. Table 3-4 summarizes the operationalization for each dimension of website design.

Table 3-4

*EC Site Features*

Dimension	Operationalization	Items
<b>Interactivity</b>	Our website responds quickly to email queries	3
	Our website lets customers easily summon a human to answer questions	
	Our website readily accepts orders worldwide	
<b>Transaction Application</b>	Our website allows customers to complete their orders online easily	3
	Our website allows customers to complete their orders online securely	
<b>Catalog Application</b>	Our website provides up to date order tracking for our customers	3
	Our website allows customers to compare multiple products easily	
	Our website allows customers to search products contents easily	
<b>Interface</b>	Our website returns answers to product searches that fit customer profiles well	3
	Our website provides rich product descriptions using multimedia	
	Our website is easy to navigate	
<b>Publishing Application</b>	Our website provides links to direct customers easily to related items	3
	Our website publishes clear answers to frequently asked questions	
	Our website publishes important company policies (i.e., on credit, privacy, or payment terms)	
<b>Server Performance</b>	Our website publishes useful general company information (e.g., company history, background, phone number, and physical location)	3
	Our website generally loads quickly	
	Our website loads quickly during sudden, large volume surges	
	Our website infrequently crashes	

The six dimensions of website design were measured using a 5-point Likert scale, ranging from “strongly disagree” (1) to “strongly agree” (5) (see Appendix E, Part 5). In addition, one open question was added to rank these six dimensions (features) from the most important (represented by 6) to the least important (represented by 1).

### ***Reliability and Validity***

There are four reliability estimates. Among them, Cronbach’s alpha is the most popular measure for reliability. The questionnaire contains six dimensions of website design that were examined by Cronbach’s alpha. Five out of the six dimensions had a Cronbach’s alpha that exceeded 0.60, the conventionally acceptable criterion, and an interface at 0.58, very close to the minimum requirement according to Nunnally (as cited in Zhuang & Lederer, 2004). However, some scholars feel that the minimum level of Cronbach’s alpha is 0.70 (Leech, Barrett, & Morgan, 2005). Therefore, the reliability of the instrument was further estimated by Cronbach’s alpha in this study.

Construct validity refers to “the degree to which inferences can legitimately be made from the operationalization in your study to the theoretical constructs on which those operationalizations were based” (Trochim, 2002, p. 15). The instrument’s validity was tested by confirmatory factor analysis which established how accurately the questions reflected each construct. Construct validity was obtained. Further, convergent validity was tested and all factor loadings were significant and discriminant validity was also examined. Thus, the validity of EC site features was well established.

## ***Part 6: IT System Integration Capability***

### ***Description***

IT system integration refers to various IT systems, such as ERP, SCM, and CRM, that are coordinated to allow online information sharing and transaction execution in the value chain. The construct has one item, measured by a 7-point scale, ranging from “no system integration at all” (1) to “completely integrated” (7), developed by the researcher (see Appendix E, Part 6). The participants, top managers of online brokerage firm, were asked to use the scale to describe the effectiveness of their system integration capabilities from a manager’s perspective.

### ***Reliability and Validity***

For IT system integration, inter-rater reliability was estimated (to see if the item is consistent in measuring system integration). A correlation analysis of inter-rater one and inter-rater two was conducted. In addition, convergent and discriminant validity was assessed to establish construct validity for IT system integration capability (using correlation to differentiate the item from other constructs).

## ***Firm Performance (Secondary Data)***

Firm performance “compares the value that an organization creates using its productive assets with the value that the owners of these assets expect to obtain” (Garbi, 2002, p. 3). Firm performance (the dependent variable) was measured by online securities trading amount (sales) and market share. Online sales and market share were assessed by calculating an annual growth rate. In this study, data for online trading amount and market share were obtained from Taiwan Stock Exchange’s trading

department for the period of July 2005 to June 2006 upon receiving approval from IRB. Thus, secondary data were used for firm performance.

### ***Reliability and Validity***

The data for online transaction value and market share derived from the Taiwan Stock Exchange was objective secondary data that provided reliable measures of firm performance. Data consisted of computerized trading results that were accumulated monthly and reflected a firm's online transaction data filings to TSE officials by e-brokerage firms (Zhu & Kraemer, 2002). Computerized data has the quality of consistency and repeatability over time (Trochim, 2002). Thus, the use of objective secondary data as firm performance was considered reliable. The validity of secondary data was established by the fact that these measures have been used in previous studies (Lee & Kim, 2002; Saini & Johnson, 2002; Zhu & Kraemer, 2002). In addition, the objective secondary data is safeguarded by a governmental third party, the Securities Exchange Commission.

### **Procedures: Ethical Considerations and Data Collection Methods**

The following section describes the ethical considerations that were taken to protect participants. Methods of data collection are discussed. Every step of the data collection in this study followed ethical considerations:

1. Permission for questionnaires to be used in this study was obtained before data collection began. Thus, three requests for permission were sent to instrument developers from the researcher's Lynn University e-mail account (see **Appendix H-J**). A six-part questionnaire was used in this study (see **Appendix E**). These parts dealt, respectively, with organizational

characteristics, top managers' profile, CEO commitment, strategy types, website design, and IT system integration capabilities.

2. An application was submitted to the Institutional Review Board (IRB) of Lynn University to for approval. A full board review by the IRB was applied because this study was conducted in a foreign country.
3. Upon receiving the approval from IRB, the survey, mailed information, and consent form used in this study were translated from English into Traditional Chinese by using the reverse-translated method (**see Appendix A-G**), with an official endorsement from an expert fluent in both the traditional Chinese and English languages to ensure the consistency of the questionnaire.
4. Upon receiving the final approval from IRB (**see Appendix A**), the target population list was drawn from the Taiwan Stock Exchange, a public website. The list contains the names of companies, their URLs, and contact numbers. Thus, the target population list, although not confidential, was treated as though confidential.
5. Online brokerage trading data was obtained from the Taiwan Stock Exchange, which routinely collects all securities trading information. Online securities trading data is sometimes reported in the daily newspaper. Thus, the data was not regarded as confidential but was treated as such.
6. Data collection took place in two stages. Phone and mail surveys were utilized. First, an initial phone call (**see Appendix K**) was made to all top managers of e-brokerage firms in Taiwan. On the phone, the researcher explained the

research purpose and obtained a mailing address to mail the survey, including a consent form (see **Appendix B**).

- a. For those top managers who elected to participate in the study, the survey and a self-addressed envelope (with return postage provided) were mailed. Anonymity of the participants was protected.
  - b. Mailed information containing a brief introduction to the study was offered to top managers who did not feel comfortable making a commitment to participate in the study over the phone. They then received a follow-up call to encourage their participation. For those top managers who agreed to participate, the survey and a self-addressed envelope (with return postage provided) were mailed.
  - c. After two weeks of the initial telephone invitation, a follow up phone call (see **Appendix K**) was made to all participants who agreed to take part in the study. For those who did not return the survey, the researcher reminded them to complete and send back the survey, and thanked them. For those who did return the survey, the research thanked them for their participation.
7. The researcher recorded the number of mail packages distributed and the number of those who refused to participate in order to calculate the response rate.
  8. The survey was coded by numbers representing different e-brokerage companies (no company names were required on the survey questionnaire); thus, anonymity of the e-brokerage companies was protected. In addition, no

personal identifiers were required on the survey questionnaire (only coded numbers appeared on the survey). As a result, the participants completed the survey voluntarily and anonymously.

9. Data collection lasted about two months to get as many respondents as possible. The start date was September 25, 2006, and data collection was completed on November 18, 2006.
10. Within a month of completing data collection, the researcher submitted the Lynn University IRB Report of Termination of Project.
11. The data collected is being kept confidential and saved electronically with security (password and identification will be required) in a computer for a period of five years.
12. Survey responses are being stored in a locked depository box and will be destroyed after a period of five years.
13. The non-public data will also be destroyed after five years.

### **Evaluation of Ethical Aspects of the Study**

This research study is regarded as ethical for the following reasons:

1. An IRB application was submitted for a full board review.
2. An approval from Lynn University's IRB ensured that this study adhered to the necessary procedures that protected human subjects.
3. Participants were informed and received a sufficient explanation of the research purpose.
4. Respondents were notified that all data collected in this study would be anonymous.

5. All the data obtained in this study is being confidential and stored electronically on “password protected” computers. All paper documents of completed questionnaires are being kept in a locked cabinet and will be destroyed after five years.
6. The IRB was informed when the study ended.

### **Methods of Data Analysis**

Data collected from the questionnaire were analyzed with the Statistical Package for Social Sciences (SPSS) (2001) version 11 to test hypotheses. Exploratory Data Analysis, Internal Consistency Reliability, Exploratory Factor Analysis, one-way ANOVA, and Hierarchical Multiple Regression were used in this study. Below were the steps that were taken before actual data analysis began.

1. Data Coding: Collected data were assigned numbers and levels to each variable in this study.
2. Exploratory Data Analysis: Descriptive statistics were computed to examine data problems and to check the statistical assumptions of the parameters that were used in this study. As a result, data problems will be solved and for variables that did not meet the statistical assumptions, transforming variables were considered.
3. Internal Consistency Reliability: Most variables consisted of data from multiple Likert-type questions. Therefore, Cronbach’s coefficient alpha was used to assess the internal consistency of the multiple-item questionnaire. Each variable had estimates of Cronbach’s coefficient *alpha* above 0.70, the



minimum required for internal consistency reliability in social science research.

4. Exploratory Factor Analysis (EFA): EFA was used to determine a larger set of items that resembled a construct. Thus, EFA was conducted to assess the multiple items of six dimensions of website design.
5. Pearson  $r$  and Spearman Correlation: Pearson  $r$  correlation was applied to investigate the association between the independent variables and the dependent variables when both were normally distributed. When both variables violated the assumption of normality, the Spearman  $\rho$ , a nonparametric statistic, was utilized.

### ***Descriptive Statistics***

Descriptive analysis was used to answer the research question. Frequency distributions, measures of central tendency, and variations were reported to obtain characteristics of all variables (sociodemographic characteristics of top managers, organizational characteristics, CEO commitment, website design, IT system integration capabilities, and strategy type).

### ***One-Way ANOVA***

Research Hypotheses 1-2 tested whether prospectors, analyzers, and defenders have a significantly higher firm performance (online sales (H1) and market share (H2) than reactors. According to Hypotheses 3-4, prospectors have a significantly higher firm performance than analyzers, defenders, and reactors. To test Hypotheses 1-4, the statistical technique of ANOVA was used to analyze the difference of different strategy types on firm performance (annual growth rate of online sales and market share).

### *Hierarchical Multiple Regression*

Research Hypotheses 5-6 tested for a significant explanatory relationship among organizational characteristics (firm size and Web age), top managers characteristics, CEO commitment, strategy types, website design, IT system integration capabilities, and firm performance (online sales [H5] and market share [H6]). To test the hypotheses, the statistical method of hierarchical multiple regression was utilized to analyze the relationship between each of the explanatory variables and the dependent variables while controlling for firm size and Web age. A regression model containing a set of independent and control variables was used to explain firm performance.

$$(1) \text{ Annual Growth Rate of Firm Performance} = \frac{R_{t-1} - R_t}{R_t}$$

Where

Firm Performance = Annual growth rate of online sales and market share

R = Growth rate

$R_{t-1}$  = Growth rate of online sales in time of t-1 (the previous period)

$R_t$  = Growth rate of online sales in time t

Firm performance was measured in terms of online sales and market share.

$$(2) \text{ Firm Performance} = c_1 + b_1X_1 + b_1X_2 + b_1X_3 + b_1X_4 + b_1X_5 \\ + b_1X_6 + b_1X_7 + b_1X_8 + b_1X_9 + b_{10}X_{10} \\ + b_{11}X_{11} + b_{12}X_{12} + b_{13}X_{13} + b_{14}X_{14} + \varepsilon_1$$

Here,

$X_1$ = CEO commitment	$X_8$ = Catalog application
$X_2$ = Prospectors	$X_9$ = Transaction application
$X_3$ = Defenders	$X_{10}$ = Server performance
$X_4$ = Analyzers	$X_{11}$ = Interface
$X_5$ = Reactor	$X_{12}$ = IT system integration
$X_6$ = Interactivity	$X_{13}$ = Firm size
$X_7$ = Publishing application	$X_{14}$ = Web age

### **Evaluation of Research Methods**

Both internal and external validity were examined to evaluate the strengths and weaknesses of this research design. On the one hand, internal validity considers the appropriateness of the study, from theory to hypotheses testing, research design, instrumentation, data collection procedures, and data analysis in terms of the relationships between independent and dependent variables. On the other hand, external validity is the approximate truth of conclusions that researchers draw for generalizations (Trochim, 2002). The research methodology was evaluated, and the following strengths and weaknesses were identified:

#### ***Internal Validity***

##### ***Strengths***

1. Using a quantitative, non-experimental, and explanatory research design is stronger than an exploratory or descriptive design.
2. This quantitative research design has higher internal validity than qualitative research methods.
3. Data analysis procedures are considered appropriate for testing the hypotheses in this study; thus, the internal validity of the study is strengthened.

4. Valid and reliable research instruments were utilized, enhancing internal validity.
5. The sample size is adequate in this study.
6. A homogenous target population in the e-brokerage sector decreases the effects of extraneous variables.
7. A back-translation of the instrument from Chinese to English was administrated to enhance the validity of the study.

### ***Weaknesses***

1. A non-experimental design is a weakness in comparison to using an experimental design.
2. Data collection using phone calls might cause researcher bias from contact with the subjects.
3. A final self-selected sample size of top managers might be small.
4. Instruments with no estimates of reliability or established validity (firm performance) might threaten internal validity.

### ***External Validity***

#### ***Strengths***

1. This study included the total target population (all top managers). Population validity of generalization was obtained.
2. The survey was completed in a natural environment (firm setting), not a laboratory setting, a strength to ecological validity.
3. This study included the total target population (all firms).

### *Weaknesses*

1. The final data-producing sample of the target population (all top managers) was self-selected; thus, a possibility of a selection bias may exist.
2. Top managers were the only participants from Taiwan's e-brokers. Their perception of corporate CEO commitment to EC, strategy type, website design and IT system integration capabilities may not be representative of all e-brokers. This might limit the external validity of the study.

Chapter III described the research methods that tested the hypotheses related to the impact of B2C EC factors (CEO commitment, strategy types, website design, and IT system integration capabilities) on firm performance (online sales and market share) for Taiwan's e-brokers. This chapter described the research design, population, sampling, instrumentation, data collection procedures (including ethical considerations and data analysis methods), and evaluation of research methods. Next, Chapter IV presents the findings of this study.

## **CHAPTER IV**

### **RESULTS**

The results of the study on the relationships among strategy types, CEO commitment, website design and IT system integration capabilities on firm performance in Taiwan's e-brokerage sector are presented in this chapter. First, descriptive analyses of sociodemographic characteristics, organizational characteristics and all other variables are provided to give a brief summary of the sample profiles. Second, the results of exploratory factor and reliability analyses which were used to validate the instruments used in this study are presented. Finally, the outcomes of inferential statistics of one-way ANOVA and hierarchical multiple regression, that were used as methods of data analyses and to answer the hypotheses testing are given.

#### **Final Data-Producing Sample and Research Question**

The accessible population of 440 division head managers and assistant managers were invited by phone calls and then by mail to participate in this study. Of the 440 managers, 187 managers agreed to participate by phone, but only 166 returned the mailed survey. Additionally, seven surveys were returned either incomplete or invalid. This resulted in a total of 159 usable responses for data analysis, representing a response rate of 36.14% (see Table 4-1). As for the firm performance data, a total of 61 e-brokerage firms was the accessible population. Only 52 e-brokerage firms' financial data out of a total of 61 firms in the sector (online sales and market shares) were used in this study, representing 85% of the population.

Table 4-1

*Summary of Responses to the Phone and Mail Survey*

Responses	Frequency	Percent
Returned	166	37.72%
Valid	159	<b>36.14%</b>
Invalid	7	1.59%
Total	440	100%

To answer the research question, the sociodemographic characteristics of top managers, organizational characteristics (firm size and Web age), CEO commitment, strategy types, website design, IT system integration capabilities, and firm performance of e-brokerage firms in Taiwan were presented first. Descriptive analyses of frequency distribution, central tendency (mean) and variance (standard deviation) were used to supply basic information about each of the sociodemographic variables. Hierarchical multiple regression was used to answer the research hypotheses.

***Sociodemographic Characteristics of Top Managers***

Characteristics of top managers (including gender, age, education level, and managers' tenure) are presented. As shown in Table 4-2, the sample indicated that the managers were dominated by males (65%). Fifty three percent of them have obtained bachelor's degrees and 43% have master's degrees. The mean age of the managers was 38.96 years, ranging from 32 to 48 years of age with a standard deviation of 2.63. As shown in Figure 4-1, the largest age group (45.9%) was between 38 and 40 years old, and the smallest age group (3.8%) was between 44 and 48 years of age. The majority (88.6%) were between 35 and 43 years old. The mean of managers' tenure was 6.32 years with a standard deviation of 3.08. Most top managers stayed with the same company for 4-6

years (43.4%), followed by 7-9 years (29.6%), 1-3 years (15.1%), and 10-12 years (7.6%) (see Figure 4-2).

Table 4-2

*Sociodemographic Characteristics of Top Managers by Gender, Age, Education Level, and Tenure*

<b>Demographic Variables</b>	<b>Frequency</b>	<b>Percent</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>Gender</b>				
Female	56	35.2%		
Male	103	64.8%		
Total	159	100%		
<b>Education</b>				
Associate's Degree	6	3.8%		
Bachelor's Degree	84	52.8%		
Master's Degree	69	43.4%		
Total	159	100%	2.4	0.56
<b>Age</b>				
32-34	12	7.6%		
35-37	40	25.2%		
38-40	73	45.9%		
41-43	28	17.6%		
44-48	6	3.8%		
Total	159	100%	38.96	2.63
<b>Tenure</b>				
1-3	24	15.1%		
4-6	69	43.4%		
7-9	47	29.6%		
10-12	12	7.6%		
13-15	5	3.1%		
16-20	2	1.3%		
Total	159	100%	6.32	3.08



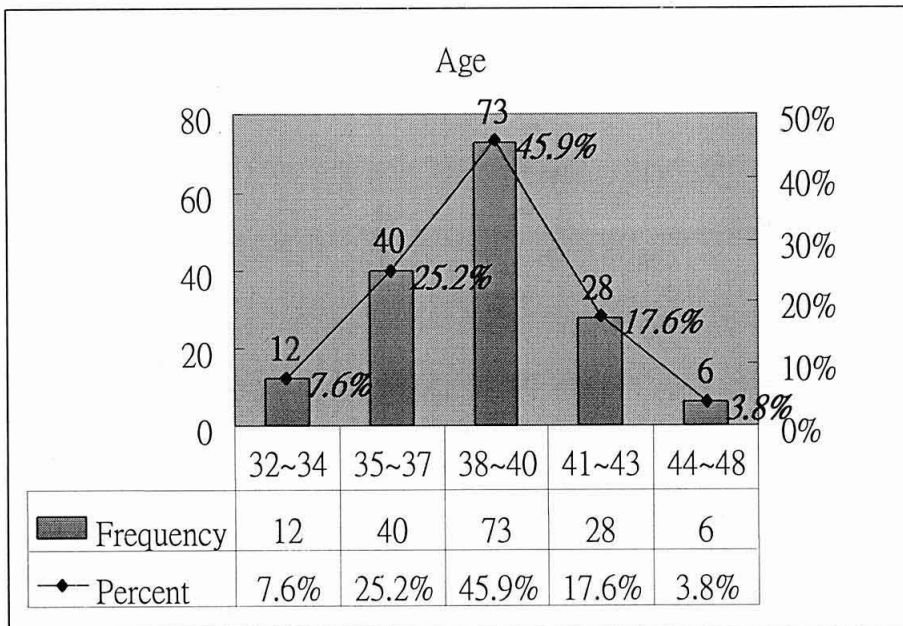


Figure 4-1. Frequency and percent distribution of top managers' age.

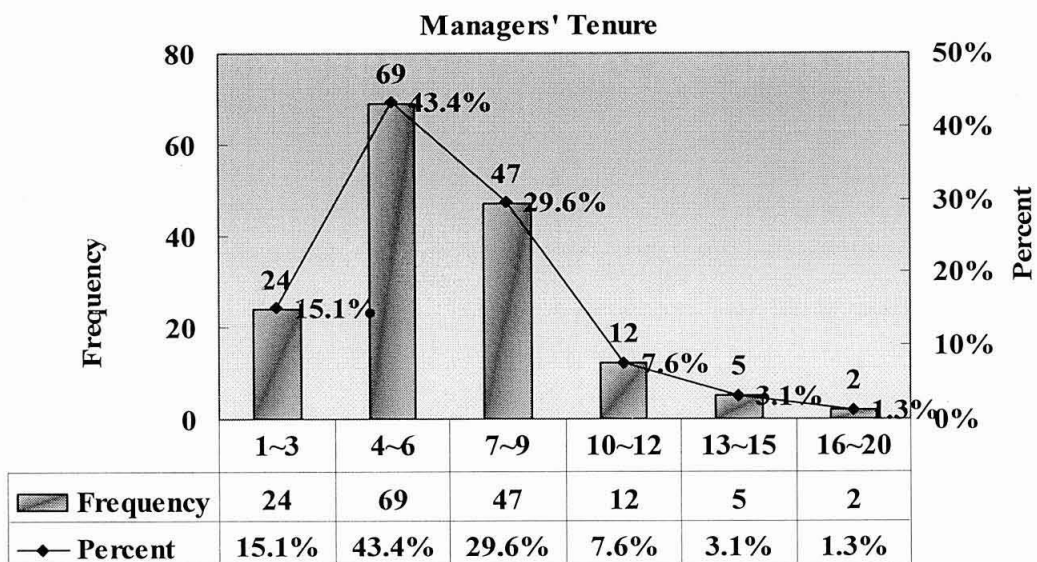


Figure 4-2. Frequency and percent distribution of top managers' tenure.

### *Organizational Characteristics*

Organizational characteristics (including firm size and web age) are presented. Descriptive analyses of means and standard deviations are shown in Table 4-3. Taiwanese e-brokerage firms had a mean of 81.74 months (approximately 6.8 years) operating online (to generate online sales), ranging from 22 to 108 months with a standard deviation of 18.18 months. In addition, the number of employees working in e-brokerage firms ranged from 32 to 6,612 with a mean of 1,526 employees. Due to the severe skewness, a transformation of the data was applied using the logarithm of employee number to minimize the distortion.

Table 4-3

#### *Organizational Characteristics of Web Age and Firm Size*

Descriptive Analyses	Web Age (Month)	Web Age (Scale)	Employee Number	Log(Employee)
N (Valid)	159	159	159	159
Mean	81.74	3.93	1526.41	2.86
Median	86.00	4.00	1320.00	3.12
Std. Deviation	18.18	1.27	1610.77	0.62
Skewness	-1.06	-0.11	1.52	-0.46
Std. Error of Skewness	0.19	0.19	0.19	0.19
Minimum	22	1	32	1.51
Maximum	108	6	6612	3.82

Figure 4-3 presents the frequency distribution of organizational web age (in months). Most e-brokerage firms had used EC for 61 to 80 months (27%), 81 to 90 months (24.5%), and 91 to 100 months (23.9%). The majority of e-brokerage firms in Taiwan had operated online at least 5 years (above 60 months), representing 75% of the

final sample. In addition, only four (2.5%) e-brokerage firms had operated online for 22 to 40 months (less than 4 years).

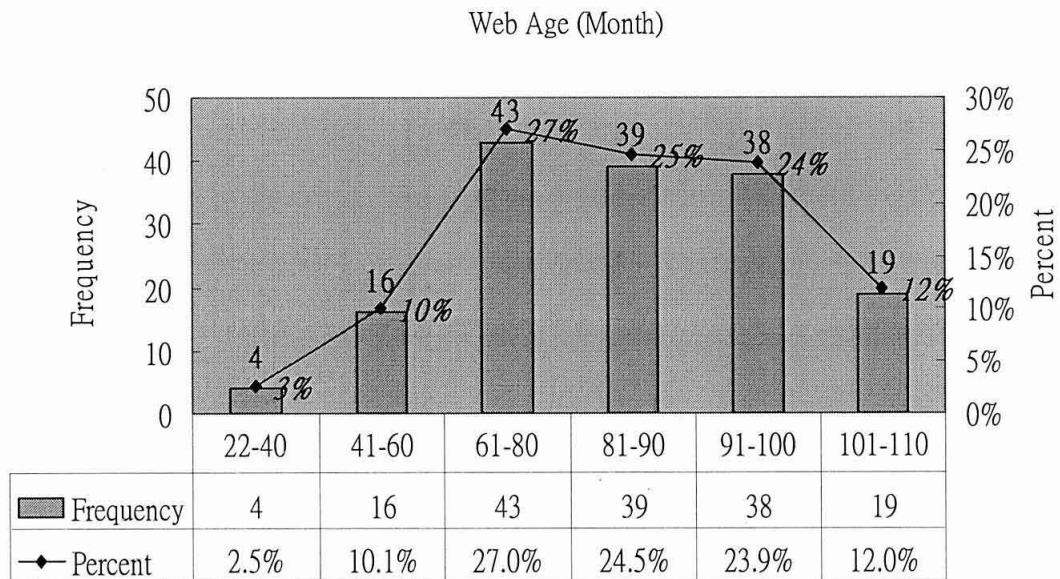


Figure 4-3. Frequency and percent distribution of organizational web age.

### *Top Managers' Perceptions of Strategy Type*

Participating managers were asked to select from four descriptive paragraphs (representing four unlabeled strategy types) the one that best represented their firm's strategy. This measurement was developed by Snow and Hrebiniak (1980). Figure 4-4 shows the frequency distribution of top managers' perception of their corporate strategic type. Among the 159 respondents, 69 (43.4%) top managers perceived their company's strategic type as defenders. Forty-two managers identified their strategic type as analyzers, about 26.4% of the total sample. Twenty-eight respondents recognized their

corporate strategy to be prospectors, equal to 17.6% of the total sample. The smallest group identified was the reactors, which made up 12.6% of the total sample.

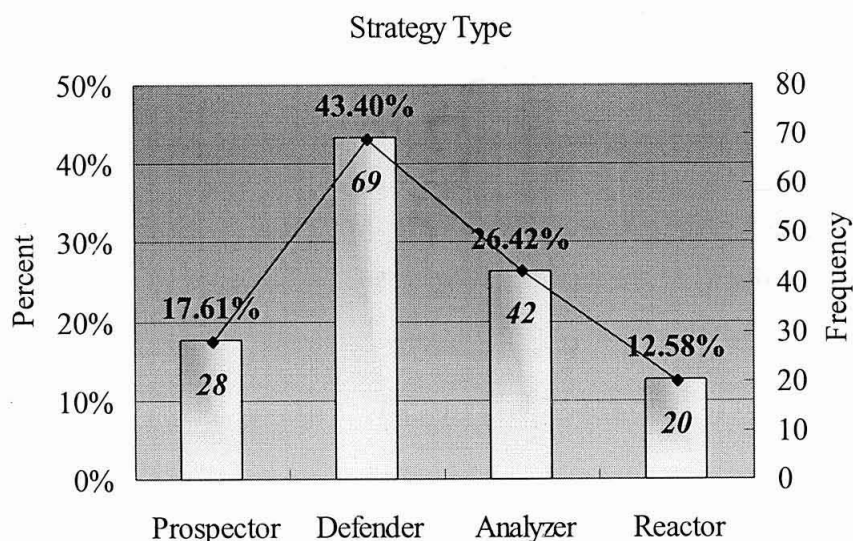


Figure 4-4. Frequency and percent distribution of top managers' perceptions of strategy type.

#### *Top Managers' Perceptions of CEO Commitment to EC*

Participating managers were asked to respond to three items about their top executives' commitment to EC. The CEO commitment was a one-dimensional measurement developed by Powell and Dent-Micallef (1997) and further revised by Zhuang and Lederer (2004). Each item was rated on a 5-point Likert scale from "strongly disagree" (1) to "strongly agree" (5).

Table 4-4 shows the percent distribution of response categories, item means, standard deviations, and dimension scores for CEO commitment. The measurement of CEO commitment had a mean score of 3.61, ranging from item one at 3.12 (the lowest), to item three at 4.11 (the highest), with a standard deviation of 0.73. Top managers

perceived item one as the most neutral (35.22%), followed by agree (32.70%), and disagree (25.9%). For items two and three, the degree of CEO commitment perception was elevated. Most top managers agreed that CEO's had either supported EC (49.69%) or shown that EC was important (55.97%). The mean for item three was the highest at 4.11 (between agree and strongly agree). Overall, the measurement had a mean dimension score of 10.83.

Table 4-4

*Percent Distribution of Top Managers' Perceptions of CEO Commitment*

Item	Response Categories (Percent Distribution)					Mean	Std. Deviation
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree		
<b>CEO Commitment</b>	1	2	3	4	5	3.61	0.72
1. Our top executives have clearly indicated their commitment to EC	1.89%	25.79%	35.22%	32.70%	4.40%	3.12	0.91
2. Our top executives have supported EC within the company	1.89%	10.69%	25.16%	49.69%	12.58%	3.60	0.91
3. Our top executives have shown that EC is important to the company	0.63%	1.89%	12.58%	55.97%	28.93%	4.11	0.73
Dimension Score (Range 3-15)						10.83	

*Top Managers' Perceptions of Website Design Capabilities*

Website design capabilities have six sub-constructs (or dimensions), developed by Zhuang and Lederer (2004). The six dimensions of website design capabilities used a 5-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (5). Table 4-5 shows the percent distribution of response categories, means, and standard deviations of the six dimensions. Each dimension contained three items with a possible range between

Table 4-5

*Percent Distribution of Top Managers' Perceptions of Website Design Capabilities:  
Interactivity, Transaction, Catalog, Interface, Publishing, and Server (N=159)*

Item	Response Categories (Percent Distribution)					Mean	Std. Deviation
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree		
	1	2	3	4	5	3.97	0.47
<b>Interactivity</b>							
1. Our website responds quickly to email queries	0.0%	4.4%	17.6%	62.9%	15.1%	3.89	0.70
2. Our website lets customers easily summon a human to answer questions	0.6%	2.5%	10.1%	73.6%	13.2%	3.96	0.63
3. Our website readily accepts orders worldwide	13.2%	25.2%	27.0%	33.3%	1.3%	2.84	1.07
Dimension Score (Range 3-15)						11.31	
						<b>3.97</b>	<b>0.47</b>
<b>Transaction Application</b>							
4. Our website allows customers to complete their orders online easily	1.3%	2.5%	3.1%	62.3%	30.8%	4.19	0.72
5. Our website allows customers to complete their orders online securely	0.0%	0.6%	6.3%	83.6%	9.4%	4.02	0.43
6. Our website provides up to date order tracking for our customers	0.6%	3.1%	27.0%	62.9%	6.3%	3.71	0.66
Dimension Score (Range 3-15)						11.84	
						<b>3.38</b>	<b>0.69</b>
<b>Catalog Application</b>							
7. Our website allows customers to compare multiple products easily	0.6%	21.4%	27.0%	47.8%	3.1%	3.31	0.87
8. Our website allows customers to search products contents easily	0.6%	13.8%	20.1%	57.2%	8.2%	3.58	0.85
9. Our website returns answers to product searches that fit customer profiles well	3.1%	19.5%	30.2%	44.0%	3.1%	3.25	0.91
Dimension Score (Range 3-15)						10.17	
						<b>3.73</b>	<b>0.66</b>
<b>Interface</b>							
10. Our website provides rich product descriptions using multimedia	0.6%	7.5%	20.1%	57.9%	13.8%	3.77	0.81
11. Our website is easy to navigate	1.3%	8.2%	16.4%	66.0%	8.2%	3.72	0.78
12. Our website provides links to direct customers easily to related items	1.3%	8.8%	19.5%	58.5%	11.9%	3.71	0.84
Dimension Score (Range 3-15)						11.13	
						<b>3.99</b>	<b>0.68</b>
<b>Publishing Application</b>							
13. Our website publishes clear answers to frequently asked questions	0.0%	9.4%	13.2%	52.8%	24.5%	3.92	0.87
14. Our website publishes important company policies	0.0%	9.4%	16.4%	54.7%	19.5%	3.84	0.85
15. Our website publishes useful general company information	0.0%	3.1%	8.2%	53.5%	35.2%	4.21	0.72
Dimension Score (Range 3-15)						11.86	
						<b>3.70</b>	<b>0.47</b>
<b>Server Performance</b>							
16. Our website generally loads quickly	0.0%	1.9%	5.0%	76.7%	16.4%	4.08	0.53
17. Our website loads quickly during sudden, large volume surges	0.6%	9.4%	49.1%	39.6%	1.3%	3.31	0.69
18. Our website infrequently crashes	1.3%	1.9%	22.6%	73.6%	0.6%	3.7	0.58
Dimension Score (Range 3-15)						11.08	
						<b>3.79</b>	
Average Item Score for Total Website Design							
Total Website Design Score (range 48-76)						<b>68.22</b>	

three and 15. Therefore, the total 18 items of website design capabilities had a total score range between 18 and 90.

Overall, the average mean score of the instrument was 3.79 (between neutral and agree). The highest rated dimension was publishing application, which had a mean of 3.99 (close to agree) and the lowest rated dimension was catalog application which had a mean of 3.38 (close to neutral). Further, the dimensions of interactivity and transaction application had the same mean of 3.97 (close to agree). Interface dimension had a mean of 3.73 and the server performance dimension had a mean of 3.70.

The frequency distributions for each dimension were quite similar. Most top managers perceived “agree”, positive for their website design capabilities. Within the interactivity dimension, 73% of top managers agreed that their website responds to customer’s questions. As for the transaction application, 83.6% of top managers agreed that their website provides secure online transactions. For the interface dimension, 66% of top managers agreed that their website is easy to navigate. Finally, 76.7% of top managers agreed that their server can download information quickly.

An open-end question was added to the instrument by the researcher to ask top managers to rate the six dimensions from the least important (1) to most important (6). The results are shown in Table 4-6. The total valid responses for this question were 135. Among them, 53 (39.3%) of top managers rated interactivity as the most important website feature, followed by transaction (30.4%) and interface (19.3%). The least important dimension was publishing with 5.7% of the total responses.

Table 4-6

*Frequency and Percent of Importance Rating of Website Design Features*

	6		5		4		3		2		1	
<b>Dimension</b>	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Transaction	41	30.4%	33	24.4%	29	21.5%	25	18.5%	6	4.4%	1	0.7%
Interactivity	53	39.3%	34	25.2%	37	27.4%	9	6.7%	2	1.5%	0	0.0%
Publishing	4	3.0%	3	2.2%	12	8.9%	18	13.3%	21	15.6%	77	57.0%
Interface	26	19.3%	35	25.9%	23	17.0%	27	20.0%	17	12.6%	7	5.2%
Catalog	8	5.9%	18	13.3%	17	12.6%	30	22.2%	41	30.4%	21	15.6%
Server	3	2.2%	12	8.9%	17	12.6%	26	19.3%	48	35.6%	29	21.5%

*Top Managers' Perceptions of IT System Integration Capability*

IT system integration refers to various IT systems that are coordinated in the value chain (Barua et al., 2004). This measurement has only one item, developed by the researcher. The one item was measured by a 7-point scale, ranging from "no system integration at all" (1) to "completely integrated" (7). Top managers in the e-brokerage firms were asked to rate the effectiveness of their system integration capability. IT system integration had a mean of 3.65 (between 31% and 70% of system integration) with a standard deviation of .47. Figure 4-4 presents the frequency distribution of IT system integration in the Taiwanese e-brokerage firms. Thirty-nine top managers perceived their IT system integration to be 31 to 50%, representing 24.5% of the total sample. Another 33 top managers believed that their IT system integration had reached 51 to 70%, making up 20.8% of the total sample. Additionally, 14 top managers perceived no IT system integration at all, while two top managers believed their IT system to be completely integrated.



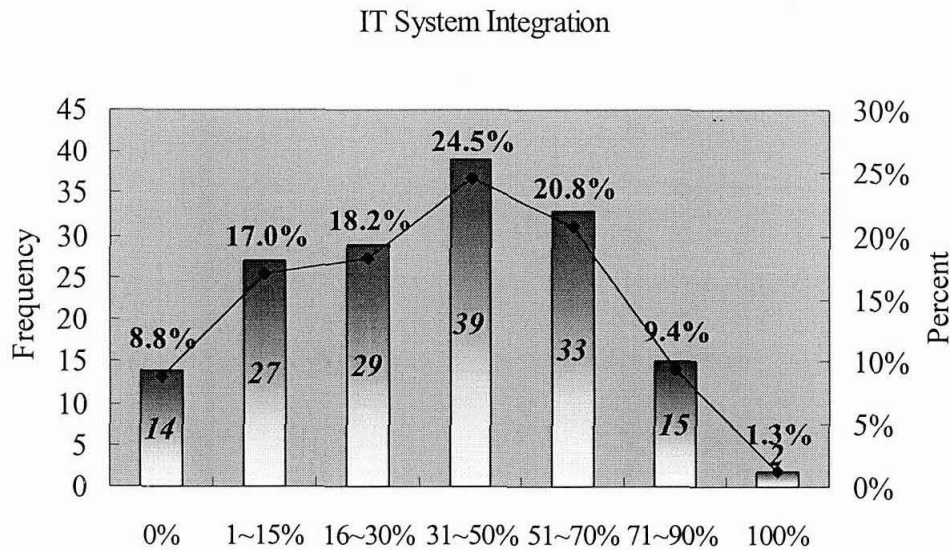


Figure 4-5. Frequency and percent distribution of IT system integration capability.

### *Descriptive Analysis of Firm Performance*

Firm performance (the dependent variable) was assessed by secondary data using online transaction value (online sales) and market share. The data was obtained from the Taiwan Stock Exchange's trading department for the period between July 2005 and June 2006. Annual growth rate was calculated for online sales and market shares for Taiwan's e-brokers. Table 4-7 shows the mean, standard deviation, and Skewness of the firm performance variables. Online annual sales growth rate Online Annual Sales Growth Rate had a mean of 4.17 and standard deviation of 2.3. In addition, online annual market share growth rate (OAMSGR) had a mean of 3.25 with a standard deviation of 1.72. The Skewness of the dependent variables was under positive or negative one, meaning that the sample was normally distributed (Leech, Barrett, & Morgan, 2005).

Table 4-7

*Descriptive Analysis of Online Sales and Market Shares*

Statistics		OASGR	OAMSGR
N	Valid	159	159
	Missing	0	0
Mean		4.17	3.25
Std. Deviation		2.30	1.72
Skewness		0.29	0.57
Std. Error of Skewness		0.19	0.19
Minimum		1	1
Maximum		8	7

Figure 4-6 illustrates the frequency and percent of OASGR. The highest frequency (38) and percent (23.9) of the OASGR was found between -11.99% to -0.01%. The second largest OASGR had two groups, ranging between 16.01% and 20% and above 100%. The smallest group of OASGR had an annual growth rate between 27.01% and 100%. The worst performer had a negative annual growth rate between -12% and -41.90%, with a frequency of 17 equal to 10.7 percent.

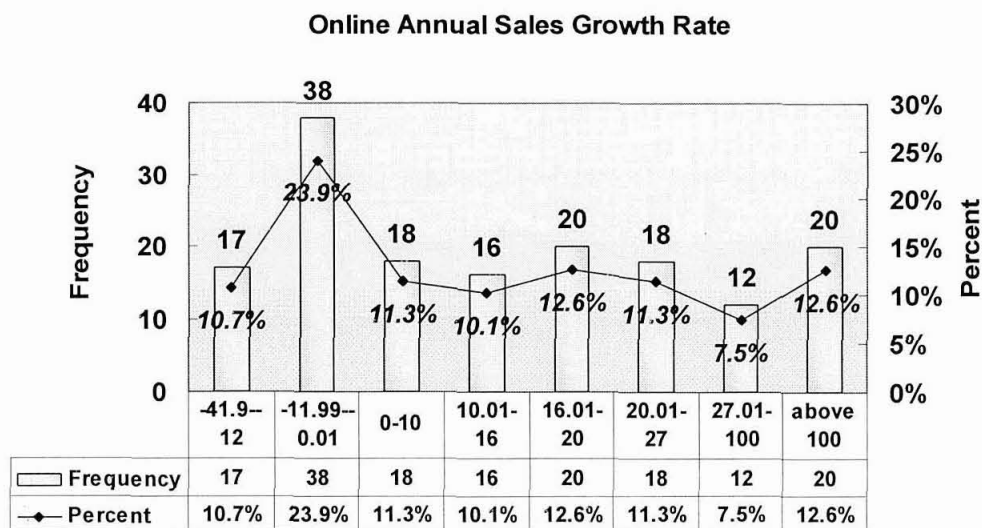


Figure 4-6. Frequency and percent distribution of online annual sales growth rate.

As of June 2006, e-brokerage firms in Taiwan had online annual market share growth rate (OAMSGR) ranging from -50% to 500%. Figure 4-7 demonstrates the frequency and percent of OAMSGR. The highest frequency and percent of OAMSGR ranged from 14.9% to 0%, and were 48 and 30.2, respectively. Further, OAMSGR ranged between 10.01 and 20% with a frequency of 32 and a percentage of 20.13, followed by a range between -50% and 15%, with a frequency of 23 and a percentage of 14.5. The highest OAMSGR, between 251% and 500%, had the lowest frequency of 9 and 5.7 percent.

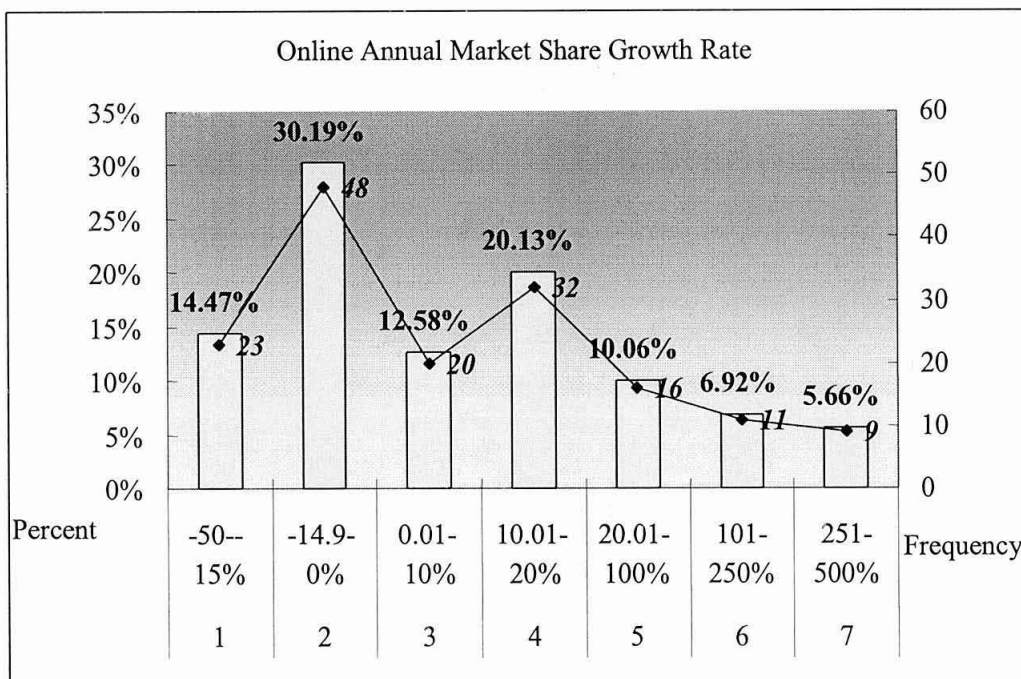


Figure 4-7. Frequency and percent distribution of online annual market share growth rate.

Descriptive analyses of frequency distribution, mean, and standard deviation were used to assess sociodemographic variables (top manager's profile), organizational

characteristics (firm size and web age), strategy type, CEO commitment to EC, website design and IT system integration capabilities. In addition, descriptive analyses of firm performance included online sales and market shares. Before hypotheses testing, exploratory factor analysis and reliability analysis were conducted to establish validity and provide estimates of reliability. The following section provides the results of exploratory factor analysis and reliability analysis.

### **Construct Validity**

#### ***Correlation Matrix***

Construct validity determines how the operationalization of the measurement can be generalized to the intended concept and the accuracy with which it reflects its construct (Trochim, 2002). In general, construct validity consists of predictive, concurrent, convergent, and discriminant validity (Trochim, 2002). A correlation matrix was used to show each item's association with each of the other items. When the association between the two items is high, convergent validity is established; whereas, when the association between the two items is low, discriminant validity is established. Because the measurement of CEO commitment to EC adopted in this study was a uni-dimensional instrument, and IT system integration capability was a one item survey developed by the researcher, their construct validity cannot be tested by exploratory factor analysis. Therefore, convergent and divergent validity was assessed to show that items of CEO commitment, IT system integration, and website design constructs were different from each other. As a result, the construct of CEO commitment was further

validated by convergent and discriminant validity, and construct validity of IT system integration capability was established.

To distinguish items that differ from the other constructs (discriminant validity), the correlation should be lower than .6, and no higher than .7 (Leech, Barett, & Morgan, 2005). Table 4-8 presents the correlation matrix showing associations between each pair of item. A total of 22 inter-item correlation coefficients were lower than .7. However, eight pairs of associations were higher than .6. The highest association was found between CEO commitment item 2 and item 3. Since both items represent the same construct, their high correlation shows convergent validity. The second highest association was found between interactivity item 3 and catalog item 3. They were factored into the same construct (see the following section of exploratory factor analysis) and the same situation was applied to pairs of catalog item 2 and interface item 2, and interactivity item 1 with publishing item 1 and item 2. However, the associations among CEO commitment item 1, IT system integration, and Interactivity item 3 had the same correlation of .63. As their correlations were lower than .7 and close to the minimum level, discriminant validity was considered established among constructs of CEO commitment, website design, and IT system integration capabilities.

Table 4-8

*Correlation Matrix of Website Design, CEO commitment, and IT System Integration Items*

Item	Intera1	Intera2	Intera3	Transa1	Transa2	Transa3	Catal1	Catal2	Catal3	Interf1	Interf2	Interf3	Publ1	Publ2	Publ3	Serv1	Serv2	Serv3	CEO1	CEO2	CEO3	IT IG
Intera1	1.00																					
Intera2	0.52	1.00																				
Intera3	0.34	0.29	1.00																			
Transa1	0.45	0.58	0.28	1.00																		
Transa2	0.28	0.24	0.23	0.32	1.00																	
Transa3	0.34	0.37	0.48	0.47	0.33	1.00																
Catal1	0.05	0.13	0.54	0.13	0.05	0.32	1.00															
Catal2	0.43	0.39	0.41	0.51	0.26	0.56	0.30	1.00														
Catal3	0.32	0.24	<b>0.64</b>	0.27	0.20	0.47	0.55	0.46	1.00													
Interf1	0.34	0.37	0.39	0.36	0.27	0.44	0.33	0.50	0.43	1.00												
Interf2	0.43	0.42	0.43	0.45	0.22	0.57	0.25	<b>0.61</b>	0.44	0.43	1.00											
Interf3	0.31	0.40	0.37	0.52	0.14	0.52	0.34	0.59	0.45	0.50	0.59	1.00										
Publ1	<b>0.63</b>	0.44	0.37	0.46	0.24	0.36	0.23	0.52	0.36	0.42	0.44	0.27	1.00									
Publ2	<b>0.62</b>	0.44	0.33	0.53	0.29	0.35	0.07	0.50	0.35	0.37	0.42	0.38	0.55	1.00								
Publ3	0.50	0.40	0.32	0.43	0.23	0.43	0.21	0.48	0.28	0.47	0.42	0.37	0.50	0.56	1.00							
Serv1	0.36	0.50	0.23	0.42	0.13	0.22	0.11	0.36	0.20	0.47	0.31	0.35	0.38	0.45	0.34	1.00						
Serv2	0.28	0.37	0.31	0.45	0.15	0.44	0.26	0.55	0.36	0.40	0.37	0.48	0.39	0.33	0.33	0.37	1.00					
Serv3	0.35	0.51	0.31	0.50	0.18	0.39	0.15	0.48	0.21	0.43	0.46	0.45	0.36	0.54	0.37	0.48	0.41	1.00				
CEO1	0.28	0.23	<b>0.63</b>	0.24	0.19	0.48	0.49	0.50	0.58	0.43	0.45	0.48	0.26	0.22	0.33	0.24	0.36	0.26	1.00			
CEO2	0.46	0.43	0.50	0.40	0.08	0.49	0.40	0.50	0.51	0.46	0.51	0.52	0.36	0.46	0.41	0.34	0.33	0.45	0.58	1.00		
CEO3	0.47	0.41	0.44	0.51	0.24	0.51	0.30	0.52	0.42	0.53	0.48	0.49	0.47	0.49	0.56	0.38	0.32	0.37	0.48	<b>0.66</b>	1.00	
IT IG	0.31	0.26	<b>0.63</b>	0.20	0.29	0.44	0.53	0.45	0.59	0.49	0.43	0.39	0.40	0.39	0.41	0.22	0.46	0.27	<b>0.63</b>	0.49	0.44	1.00

### *Exploratory Factor Analysis*

Factor analysis helps to identify a set of interrelated variables that represent the underlying construct (George & Mallery, 2003). One instrument adopted in this study had construct validity assessed by the instrument developers. Thus, the factor analysis in this study was mainly executed to examine whether or not the same set of interrelated variables still represented the same construct based on the sample collected from top managers in Taiwan's e-brokerage firms. In addition, the result of factor analysis could further validate the instrument.

The original instrument of EC site features (website design capabilities) has six dimensions, interactivity, transaction application, catalog application, interface, publishing application, and server performance. Each dimension has three items. Factor analysis was utilized to examine whether or not the same items still hung together as a group. Before conducting factor analysis, two tests of Kaiser-Meyer-Olkin (KMO) and Barlett were needed. Both are tests of multivariate normality and adequacy of items for conducting factor analysis (George & Mallery, 2003). KMO tests should be greater than .7 demonstrating that items for each factor are sufficient (George & Mallery, 2003). Barlett's test needs to have a significant value less than .05 indicating that items do not generate an identity matrix (Leech, Barrett, & Morgan, 2005).

Table 4-9 shows that the KMO test was greater than .90, meaning that items for each factor were sufficient and that Barlett's test was significant ( $p < .000$ ). The results of both tests indicated that these items were multivariate, normal and suitable for factor analysis.

Table 4-9

*KMO and Barlett's Test*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.908
Bartlett's Test of Sphericity	Approx. Chi-Square	1367.837
	df	153
	Sig.	.000

Principal axis factoring was used with varimax rotation (used for factors that are uncorrelated with each other). Based on the research conducted by Zhuang and Lederer (2004), the instrument developers, items were factored into six sub-constructs (or dimensions), interactivity, transaction, catalog, publishing application, interface, and server performance. Table 4-10 presents the results of factor analysis for this study. All factor loadings were greater than .4, the minimum acceptable level for items to be grouped as measuring the same construct (construct validity) (Leech, Barrett, & Morgan, 2005). However, the 17-item instrument, except for Interface item1, was grouped into five sub-constructs, which differed from the original design of six.

The difference between the initial six and the new five sub-constructs was partly caused by some items with similar meaning grouped into other sub-constructs. In addition, the number of items belonging to two sub-constructs increased from three to four. The first sub-construct, interface, had two new items from catalog item 2, "our website allows customers to search products contents easily," and server item 2, "our website loads quickly during sudden, large volume surges." Interface refers to ease of navigation, so allowing customers to search products easily meets the meaning of ease of navigation. In addition, when a website can load information quickly, customers are



Table 4-10

*Factor Loadings for the Website Design Capabilities*

Item	Factor Loadings				
	Interface	Publishing	Catalog	Interact & Server	Transaction
Interface3	0.68				
Catalog2	0.66				
Interface2	0.57				
Sever2	0.47				
Interact1		0.74			
Publsiing1		0.67			
Publishing2		0.64			
Publishing3		0.50			
Interact3			0.72		
Catelog3			0.72		
Catalog1			0.71		
Interact2				0.63	
Server1				0.62	
Server3				0.52	
Transact1					0.59
Transact2					0.53
Transact3					0.41

likely to use and perceive the website as easy to use. Therefore, the two items could be grouped into the interface sub-construct.

Under the publishing sub-construct, one item of interactivity, “our website responds within 48 hours to e-mail queries,” was added. Publishing application provides information to create customer trust. A website that responds to customers efficiently is likely to give customers an impression of being responsible (being there for them), a

good way to build customer trust. Hence, the item could be categorized into this sub-construct.

One additional item was grouped into the catalog sub-construct. Interactivity item 3, “our website readily accepts orders worldwide” was recognized as associated with the catalog sub-construct. The catalog application provides information about products and services. Interactivity item 3 seems to be related with services information indicating, that the website is able to take orders worldwide. Thus, the item could be considered the same as the sub-constructs of catalog application.

The fourth sub-construct grouped interactivity item 2, server item 1, and item 3 together. Interactivity refers to user friendliness and server performance represents a site’s download speed. These two sub-constructs are complementary to each other. Thus, the researcher did not change the name but combined the two together. Finally, the transaction application sub-construct was the only one that remained unchanged.

This section established the validity of the instrumentation. First, a correlation matrix was created to establish convergent and discriminant validity of CEO commitment to EC and IT system integration capability. Second, exploratory factor analysis was utilized to establish the construct validity of website design capabilities.

### ***Reliability Analysis***

Reliability is intended to estimate the quality, meaning the consistency and repeatability, of measurement (Trochim, 2002). According to Trochim (2002), four types of reliability estimates are generally used. First, internal consistency reliability based on Cronbach’s coefficient alpha ( $\alpha$ ) is used for multiple item scales to test the consistency of

results. Two reliability tests are utilized for one-item measures. Test-retest reliability is used to determine whether measurement results are consistent over time. Inter-rater reliability examines correlated different raters to see whether they provide consistent estimates. Last, parallel-forms reliability is used to see whether the results of two tests constructed in the same way in the same domain are consistent.

#### ***Reliability Estimates of CEO Commitment to EC***

In this study, internal consistency reliability used Cronbach's alpha to test the consistency of website design capabilities which had five sub-constructs (after the factor analysis) and was different from the initial six sub-constructs. Cronbach's alpha should be higher than .7, the minimum acceptable level (Leech et al., 2005). The Cronbach's alpha for CEO commitment to EC dimension was .80, exceeding the required minimum level. Thus, internal consistency of CEO commitment to EC was reliable.

#### ***Reliability Estimates of Website Design Capability***

Table 4-11 shows the estimates of internal consistency reliability for website design capabilities. Four out of the five sub-constructs of website design capabilities met the minimum .7 level, indicating that the items of the instrument were internally consistent. Only the sub-construct of transaction application had a Cronbach's alpha of .67, and because it was very close to .7 the sub-construct was accepted in this study.

#### ***Reliability Estimates for Miles and Snow's Strategic Typology***

Inter-rater reliability was executed to assess the consistency of strategy type. Since the level of measurement of Miles and Snow's strategic typology is nominal, Cronbach's alpha could not be used to test its reliability. In this study, as more than one

Table 4-11

*Internal Consistency Reliability of Website Design Capabilities*

Variables	Items	Cronbach's Alpha ( $\alpha$ )
Interface	4	0.82
Publishing Application	4	0.83
Catalog Application	3	0.79
Interactivity and Server Performance	3	0.75
Transaction Application	3	0.67

respondent filled out the survey for the same e-brokerage firm. Thus, inter-rater reliability estimates were performed to determine whether rater one and rater two agreed on the same item. Cohen's Kappa is a measure of reliability for nominal measures and should be greater than .70 (Leech et al., 2005). The cross tabulation table shown in Table 4-12 presents the reliability results for the strategic typology. The measure of agreement between rater one and rater two is indicated by Kappa which had a value of .73, greater than the minimum .70 level, with a significance level of  $p < .000$ . Therefore, the measure of strategic typology was considered reliable.

Table 4-12

*Inter-rater Reliability of Miles and Snow's Strategic Typology*

	Value	Asymp. Std. Error(a)	Approx. T(b)	Approx. Sig.
Measure of Agreement Kappa	0.73	0.083	8.298	0.000
N of Valid Cases	51			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

### ***Reliability Estimates for IT System Integration Capability***

Inter-rater reliability was estimated for the new item of IT system integration capability, measuring the level of IT system integration. Table 4-13 presents the inter-rater correlations between rater one and rater two. The association between the two different raters was high, at .83 with a significance level of  $p < .00$ . As a result, inter-rater reliability of IT system integration capability was internally consistent.

Table 4-13

#### ***Inter-Rater Reliability of IT System Integration Capability***

<b>IT System Integration</b>		<b>Inter-Rater 1</b>	<b>Inter-Rater 2</b>
Inter-Rater 1	Pearson Correlation	1	0.83
	Sig. (2-tailed)		0.00
	N	51	51

\*\*Correlation is significant at the 0.01 level (2-tailed).

Descriptive analyses were conducted not only to have a general idea of the sample but to also answer the research question. In addition, exploratory factor analysis was run to examine the construct validity of instruments used in this study. Moreover, reliability analyses were estimated to assess internal consistency of measurement. After validation of measurement was completed, one-way ANOVA and hierarchical multiple regression were conducted to test the research hypotheses.

### **Research Hypotheses**

#### ***One-Way ANOVA***

Miles and Snow's (1978) strategic typology originally proposed that prospectors, analyzers, and defenders are likely to outperform reactors in "brick and Mortar".

However, findings in B2C EC suggest that prospectors are likely to outperform other strategic types (Saini & Johnson, 2002). Therefore, these two sets of hypotheses (H1 to H4) were both tested in this study.

To answer these hypotheses (H1 to H4), one-way ANOVA was used to compare mean differences between the four strategy types in OASGR and OAMSGR. Further, post hoc tests using the Least Significant Difference (LSD) and more rigorous Scheffe were utilized to detect differences. First, descriptive analyses of means and standard deviations were executed. Second, one-way ANOVA was run to compare means between the four strategy types. When significant differences were found, post hoc multiple comparisons were tested. The followings are H1 and H3.

H1: Taiwanese e-broker firms whose top managers report using prospector, analyzer, and defender type strategies have significantly higher online sales than Taiwanese e-broker firms whose top managers report using reactor strategies.

H3: Taiwanese e-broker firms whose top managers report using prospector type strategies have significantly higher online sales than Taiwanese e-broker firms whose top managers report using analyzer, defender, and reactor strategies.

Table 4-14 presents means and standard deviations of online annual sales growth rate for the four strategy types. Among the four strategy types, the OASGR of analyzers had the highest mean of 4.45 with a standard deviation of 2.28, and reactors had the lowest mean of 3.35 with a standard deviation of 2.21. In addition, defenders had a mean

score of 4.39 with a standard deviation of 2.44 and prospectors had an average mean of 3.79 with a standard deviation of 1.95.

Table 4-14

*Descriptive Analyses of OASGR between Strategy Types*

	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
Prospector	28	3.79	1.95
Defender	69	4.39	2.44
Analyzer	42	4.45	2.28
Reactor	20	3.35	2.21
Total	159	4.17	2.30

One-way ANOVA is used for comparing sample means to determine if there are significant differences between any groups. Table 4-15 presents significance levels ( $p$ ) of OASGR between the four strategy types. The results indicated that there were no significant differences between the means of the four strategy types in OASGR, as shown by a probability value of .21. No further post hoc multiple comparisons were needed. As a result, H1 and H3 were not supported, meaning that no significant differences between paired groups of prospector, defender, analyzer, and reactor strategies in OASGR were found.

Table 4-15

*ANOVA of Significant Differences of OASGR between Strategy Types*

	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig. (<math>p</math>)</b>
Between Groups	24.31	3	8.10	1.54	0.21
Within Groups	814.10	155	5.25		
Total	838.42	158			

The same procedure was conducted for testing H2 and H4.

H2: Taiwanese e-broker firms whose top managers report using prospector, analyzer, and defender type strategies have a significantly higher online market share than Taiwanese e-broker firms whose top managers report using reactor strategies.

H4: Taiwanese e-broker firms whose top managers report using prospector type strategies have a significantly higher online market share than Taiwanese e-broker firms whose top managers report using analyzer, defender, and reactor strategies.

Descriptive analyses of OAMSGRs' means and standard deviations for the four strategy types were performed. Table 4-16 shows that defenders had the highest mean of 3.43 with a standard deviation of 1.78, followed by analyzers who had a mean score of 3.40 and a standard deviation of 1.74. In addition, prospectors had a mean score of 2.96 and a standard deviation of 1.58. Reactors had the lowest mean OAMSGR of 2.65 with a standard deviation of 1.63.

Table 4-16

*Descriptive Analyses of OAMSGR between Strategy Types*

	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
Prospector	28	2.96	1.58
Defender	69	3.43	1.78
Analyzer	42	3.40	1.74
Reactor	20	2.65	1.63
Total	159	3.25	1.72



One-way ANOVA was also used in comparing sample means of OAMSGR between the four strategy types. Table 4-17 presents the *F* ratio and level of significance (*p*) of the ANOVA test. The results again indicated that no significant differences in OAMSGR between the four strategy types were found and is shown by a probability value of .23. No further testing of post hoc multiple comparisons was conducted. As a result, hypotheses H2 and H4 were rejected, meaning that there were no significant differences among prospector, defender, analyzer, and reactor strategies in OAMSGR.

Table 4-17

*ANOVA of Significant Differences of OAMSGR between Strategy Types*

	Sum of Squares	df	Mean Square	<i>F</i>	Sig. ( <i>p</i> )
Between Groups	12.84	3	4.28	1.45	0.23
Within Groups	456.59	155	2.95		
Total	469.43	158			

### ***Hierarchical Multiple Regression***

In this study, the regression model contains a set of independent and control variables to explain firm performance. To test H5 and H6, the statistical method of hierarchical multiple regression was utilized to analyze the relationship between each of the explanatory variables and the two dependent variables, online annual sales growth rate (H5) and online annual market share growth rate (H6). The following are the two hypotheses that were investigated:

H5: There is a significant positive relationship between Taiwanese top manager perceptions of CEO commitment, strategy types, website design, IT system

integration capabilities, firm size, Web age, characteristics of top managers, and online sales in Taiwan e-brokerage firms.

H6: There is a significant positive relationship between Taiwanese top manager perceptions of CEO commitment, strategy types, website design, IT system integration capabilities, firm size, Web age, characteristics of top managers, and online market share in Taiwan e-brokerage firms.

Two steps were taken to compute hierarchical multiple regression. Independent variables were entered first (Model 1) and the control variables of web age and the number of employees (Model 2) were input afterward. Independent variables included organizational characteristics (web age and number of employees), top managers' profile (gender, age, education, and managers' tenure), strategy type, CEO commitment to EC, website design capabilities (interactivity and server performance, transaction application, catalog application, interface, and publishing application), and IT system integration capability. Two financial indicators, OASGR and OAMSGR, were used as firm performance measures, the dependent variables. Before actually running hierarchical multiple regression, the nominal variable of strategy type needed to be recoded as a dummy variable.

Correlation analysis between all independent variables and OASGR is presented in Table 4-18. The results showed that four independent variables, managers' tenure ( $r = .153, p < .027$ ), catalog application ( $r = .179, p < .012$ ) (one sub-construct of website design), and CEO commitment to EC ( $r = .167, p < .018$ ), were significant and positively correlated with OASGR, whereas web age ( $r = -.179, p < .012$ ) was significantly negatively correlated.

Table 4-18

*Correlation Analysis of OASGR*

Independent Variables	Correlation <i>r</i>	Sig. ( <i>p</i> )
Managers' Tenure (years)	0.153	0.027
Website design-Catalog	0.179	0.012
CEO Commitment	0.167	0.018
Web Age (months)	-0.179	0.012

\* correlation is significant at the .05 level (2-tailed)

As shown in Table 4-19, the results of hierarchical multiple regression analysis demonstrated that the combination of three independent variables of manager's tenure, catalog application, and CEO commitment to EC significantly predicted the OASGR ( $F=2.48$ ,  $p<.01$ ) in Model 1. The adjusted  $R^2$  value was .09, meaning that 9% of variances in OASGR was explained by the three variables. In Model 2, two control variables of web age and number of employees were added, but only web age significantly contributed to the model. The adjusted  $R^2$  was .12 ( $F=2.79$ ,  $p<.001$ ) in Model 2, meaning that 12% of the variances in OASGR was predicted by the prior three independent variables and the one control variable of web age. The effect size of these two Models was considered to be rather small.

Table 4-19

*Model Summary of Hierarchical Multiple Regression Analysis for OASGR*

Model	R	R Square	Adjusted R Square	Std. Error of Estimate	<i>F</i>	Sig. ( <i>p</i> )
1	0.38	0.14	0.09	2.20	2.48	0.01
2	0.43	0.19	0.12	2.16	2.79	0.00

Table 4-20 shows the hierarchical multiple regression coefficients of the individual predictors of OASGR. A  $\beta$  weight represents the contribution to the regression model. For Model 1, the  $\beta$  weight (.32) of catalog application of website design capabilities significantly contributed to OASGR (the regression equation) ( $p < .01$ ). As for Model 2, not only catalog application but also web age ( $\beta = -.246$ ) significantly contributed to OASGR (both  $p < .01$ ). Although catalog application had a positive impact on OASGR, web age had a negative influence on OASGR. Therefore, H5 was not supported because not all variables were significant positive explanatory factors in explaining OASGR. For H5, the prediction model (2) of OASGR was:

$$\text{OASGR} = 2.655 + 0.041 * \text{Managers' Tenure} + 0.327 * \text{Catalog Application} + 0.174 * \text{CEO Commitment to EC} - 0.246 * \text{Web Age}$$

Table 4-20

*Hierarchical Multiple Regression Coefficients of OASGR*

Model		B	Std. Error	$\beta$	$t$	Sig. ( $p$ )
1	(Constant)	2.713	1.893		1.433	0.154
	Managers' Tenure	0.206	0.192	0.091	1.072	0.285
	Website Design-Catalog	1.025	0.426	<b>0.320</b>	2.406	0.017
	CEO commitment	0.582	0.411	0.182	1.416	0.159
2	(Constant)	2.655	1.983		1.339	0.183
	Managers' Tenure	0.092	0.194	0.041	0.477	0.634
	Website Design-Catalog	1.050	0.418	<b>0.327</b>	2.512	0.013
	CEO commitment	0.555	0.406	0.174	1.369	0.173
	Web Age	-0.446	0.165	<b>-0.246</b>	-2.699	0.008

The same procedure was conducted to test H6. The online annual market share growth rate was the financial indicator used as the dependent variable. Again, correlation

analysis between all independent variables and OAMSGR was first applied, and the results are shown in Table 4-21. The correlation results indicated that five independent variables were significantly related to OAMSGR. The order from the highest to lowest positive correlations was catalog application (.178), CEO commitment to EC (.156) and age (0.137). Two independent variables, web age (-.237) and interface (-.132), were negatively correlated with OAMSGR.

Table 4-21

*Correlation Analysis of OAMSGR*

Variables	Correlation <i>r</i>	Sig. ( <i>p</i> )
Age	0.137	0.044
Prospector	-0.132	0.049
CEO commitment	0.156	0.026
Catalog Application	0.178	0.012
Web Age	-0.237	0.001

Additionally, the results of hierarchical multiple regression analysis presented in Table 4-22 demonstrated that the combination of all independent variables significantly predicted the online annual market share growth rate ( $F=1.74$ ,  $p < .05$ ) in Model 1 and ( $F=2.35$ ,  $p < .00$ ) in Model 2. In addition, the adjusted  $R^2$  value was .06, meaning that 6% of the variances in OAMSGR was explained by the independent variables (except control variables). In Model 2, the two control variables of web age and number of employees were added to the independent variables. This resulted in an increase of the adjusted  $R^2$  from .06 to .12 ( $F=2.35$ ,  $p < .00$ ), indicating that 12% of the variance in online market shares was predicted by the nine independent variables and two control variables

Table 4-22

*Model Summary of Hierarchical Multiple Regression Analysis for OAMSGR*

Model	R	R Square	Adjusted R Square	Std. Error of Estimate	R Square Change	F	Sig. (p)
1	0.38	0.15	0.06	1.68	0.15	1.74	0.05
2	0.46	0.21	0.12	1.62	0.07	2.35	0.00

of web age and number of employees. The inclusion of the two variables created an increase in  $R^2$  from Model 1's .15 to Model 2's .21. The increase in the adjusted  $R^2$  to .12 in Model 2 from .06 in Model 1, indicated that the two control variables explained 6% of the additional variances in the OAMSGR. Thus, Model 2 was a better equation model to predict online annual market share growth rate but the effect size of this model was considered to be rather small, similar to the result found in OASGR.

As shown in Table 4-23,  $\beta$  coefficients of the hierarchical multiple regression models for OAMSGR are presented. In Model 1, only the catalog application of website capabilities ( $\beta = .29$ ,  $p < .02$ ) was significantly positive while IT system integration capability ( $\beta = -.356$ ,  $p < .004$ ) was significant but contributed negatively to the regression model. As for Model 2, catalog application was significant and contributed positively to OAMSGR with a  $\beta$  weight of .273 ( $p < .023$ ). In addition, IT system integration and web age were significant and contributed negatively to OAMSGR with  $\beta$  weights of  $-.292$  ( $p < .019$ ) and  $-.310$  ( $p < .001$ ), respectively. As a result, hypothesis H6 was partly rejected because not all variables were significant positive of OAMSGR.

Table 4-23

*Hierarchical Multiple Regression Coefficients of OAMSGR*

Model	Independent Variables	B	Std. Error	$\beta$	$t$	Sig.(p)
1	(Constant)	1.502	1.469		1.022	0.308
	Gender	-0.254	0.290	-0.070	-0.874	0.384
	Education	-0.100	0.281	-0.033	-0.355	0.723
	Age	0.073	0.196	0.038	0.374	0.709
	Manager's Tenure	0.086	0.166	0.051	0.519	0.605
	Prospector	-0.395	0.389	-0.090	-1.017	0.311
	Analyzer	0.313	0.354	0.080	0.885	0.378
	Reactor	-0.027	0.462	-0.005	-0.059	0.953
	CEO Commitment	0.354	0.318	0.147	1.112	0.268
	Interface	0.381	0.373	0.141	1.024	0.308
	Publishing	0.325	0.317	0.121	1.024	0.308
	Catalog	0.621	0.263	<b>0.290</b>	2.356	0.020
	Interactivity & Server	0.025	0.428	0.007	0.060	0.953
	Transaction	-0.715	0.438	-0.193	-1.631	0.105
	IT Integration	-0.411	0.140	<b>-0.356</b>	-2.938	0.004
2	(Constant)	1.967	1.510		1.303	0.195
	Gender	-0.275	0.281	-0.076	-0.980	0.329
	Education	-0.033	0.273	-0.011	-0.122	0.903
	Age	0.100	0.190	0.052	0.526	0.600
	Manager's Tenure	-0.009	0.164	-0.005	-0.053	0.958
	Prospector	-0.325	0.379	-0.074	-0.858	0.393
	Analyzer	0.286	0.344	0.073	0.832	0.407
	Reactor	-0.021	0.448	-0.004	-0.047	0.963
	CEO Commitment	0.314	0.310	0.130	1.012	0.313
	Interface	0.481	0.365	0.178	1.318	0.190
	Publishing	0.392	0.308	0.146	1.276	0.204
	Catalog	0.586	0.255	<b>0.273</b>	2.294	0.023
	Interactivity & Server	-0.066	0.416	-0.018	-0.159	0.874
	Transaction	-0.765	0.425	-0.207	-1.799	0.074
	IT Integration	-0.338	0.143	<b>-0.292</b>	-2.372	0.019
	Log Employee	0.384	0.254	0.137	1.509	0.134
	Web Age (month)	-0.418	0.123	<b>-0.310</b>	-3.407	0.001

a. Dependent Variable: OAMSGR

For H6, the prediction model of online market shares was as follow (using Model 2):

$$\begin{aligned} \text{OAMSGR} = & 1.967 - 0.076*\text{Sex} - 0.011*\text{Education} + 0.052*\text{Age} - \\ & 0.05*\text{Manager's Tenure} - 0.074*\text{Prospector} + 0.073*\text{Analyzer} - 0.004*\text{Reactor} + \\ & 0.130*\text{CEO Commitment to EC} + 0.178*\text{Interface} + 0.146*\text{Publishing} + 0.273*\text{Catalog} - \\ & 0.018*\text{Interactivity and Server} - 0.207*\text{Transaction} - 0.292*\text{IT System Integration} + \\ & 0.137*\text{Log of Employees} - 0.310*\text{Web Age} \end{aligned}$$

To test H1 to H4, one-way ANOVA was conducted. In addition, H5 and H6 were tested by hierarchical multiple regression for OASGR and OAMSGR (dependent variables). Model 2 was a better regression model to predict both OASGR and OAMSGR. Chapter V provides a discussion of the study's findings and interpretations of the results. Practical implications and conclusions are also provided. Limitations of the study are discussed and recommendations for future research are proposed.



## **CHAPTER V**

### **DISCUSSION**

Practically, firms have been trying to capitalize on EC to create added value for customers thereby creating a competitive market position and share. Academically, researchers have been seeking to find what B2C EC factors contribute to business value. However, past studies explored only one or two B2C EC factors in relation to firm performance. This study was the first to combine theories of the resource-based view of the firm with strategic typology to integrate different factors of CEO commitment to EC (as a firm's resource), website design and IT system integration capabilities (as a firm's capability), and strategy types (industry effect) to examine their impact on firm performance. Thus, the purpose of this non-experimental and correlational (explanatory) study was to explain the relationship between these B2C EC factors and performance of firms in Taiwan's online brokerage sector. This study further investigated whether different strategy types resulted in different levels of firm performance for Taiwan's e-brokers. Chapter V provides interpretations of the research findings, practical implications, limitations, and conclusions, and ends with recommendations for future research.

#### **Interpretations**

Findings in this study were compared with current literature to provide possible insights. Based on the data analysis in the previous chapter, this section provides further explanations of all variables. First, socio-demographic characteristics of top managers' profiles and organizational characteristics of firm size and web age will be presented. Second, strategy types will be discussed to see how different strategies impacted on firm

performance. Lastly, sociodemographic and organizational characteristics, strategy types, CEO commitment to EC, website design and IT system integration capabilities will be interpreted to see how these variables explain firm performance in Taiwan's e-brokerage sector.

### ***Sociodemographic Characteristics of Top Managers***

The sociodemographic characteristics of top managers included gender, age, education level, and managers' tenure. The final self-selected sample consisted of 159 respondents. In this sample, collected in Taiwan's e-brokerage firms, the position of top manager was dominated by males (65%). Of the top managers, over one-half of them hold a bachelor's degree (52.8%) and 43.4% of them hold a master's degree. Only 3.8% of top managers hold an associates diploma. The findings indicate that securities firms seem to require their top managers to have at least a bachelor's degree. The largest age group of top managers was between 38 and 40 years old, accounting for 45.9% of the total sample. The second largest age group was between 35 and 37 years old, comprising 25.2% of the total sample. Findings showed that 89% of top managers were between 35 and 43 years of age. As for managers' tenure, the majority of top managers had been employed with the company for four to six years (43.4%), followed by seven to nine years (29.6%).

An analysis of the data indicated that managers' tenure was the only sociodemographic factor to have a positive significant correlation ( $r = .153, p < .027$ ) with online annual sales growth rate (OASGR). This means that the longer top managers stayed with the same company, the more positive the impact on their firm's online sales. In addition, no sociodemographic factors contributed to the regression model of OASGR.

An analysis of the OAMSGR data indicated that managers' age was the only socio-demographic factor to have a positive significant correlation ( $r = .137, p < .044$ ). The older top managers in e-brokerage firms were, the higher the online market share of the company. No sociodemographic factors contributed to the regression model of OAMSGR.

### ***Organizational Characteristics of Firm Size and Web Age***

E-brokerage firm size was determined by the number of employees. However, the dispersion of employees among e-brokers was rather significant (standard deviation = 1,611, with a mean of 1,526); therefore, the number of employees was operationalized. Web age was also operationalized by the number of months that e-brokers had been using the Internet to generate online sales. The two factors were treated as control variables in inferential statistics.

The findings illustrated that when OASGR was used as a financial indicator (dependent variable), only web age had a significant negative correlation between the two ( $r = -.179$ ). In addition, web age contributed significantly to the regression model according to the  $\beta$  weight (-.246). Overall, the findings suggested that e-brokers are unlikely to enjoy first-mover advantage (starting online operation early). This finding was inconsistent with prior empirical studies (Auger, 2005; Saini & Johnson, 2002). However, possible explanations for the inconsistency might be due to the financial indicators chosen not being good ones. In addition, OASGR was operationalized by merely calculating the one-year growth rate, and the time period might be too short to illustrate any meaningful explanations. Use of a longitudinal study may better explain the variance of OASGR.

When OAMSGR was analyzed as firm performance, the results were similar to OASGR. Organizational characteristics of web age was also significantly negative in association with OAMSGR ( $r = -.237, p < .001$ ). In addition,  $\beta$  weight of web age ( $-.310$ ) also was a significant contributor to the regression model. Similarly, the earlier the e-broker entered the virtual world, the worse the financial performance (online market share). This finding was also inconsistent with previous empirical studies conducted by Auger (2005) and Saini and Johnson (2002). The reason for the inconsistency may be attributed to the financial indicator that only used a one-year growth rate which is too short to illustrate any meaningful explanations.

### ***Strategy Types and Firm Performance***

Based on the Miles and Snow (1978) strategic typology, one-way ANOVA was used to compare mean differences between strategy types in OASGR and OAMSGR. When OASGR and OAMSGR were the dependent variables, no significant differences ( $p < .21$  for OASGR and  $p < .23$  for OAMSGR) were found, meaning that the strategy types of prospector, defender, analyzer, and reactor showed no difference in firm performance based on both indicators. This result was inconsistent with prior empirical studies (Saini & Johnson, 2002) in EC context and was also inconsistent with, the findings from traditional brick and mortar firms (Aragon-Sanchez & Sanchez-Martin, 2005; Garrigos-Smith et al., 2005; Gibbons et al., 2003). Possible explanations for the inconsistency might be due to an inadequate choice of financial indicators for analysis. Additionally, the chosen OASGR and OAMSGR were operationalized by only calculating the one-year growth rate, and the time frame may be too short to show a significant positive association.

Strategy types were one of the independent variables used to explain OASGR and OAMSGR. Findings indicated that all four strategy types were insignificant explanatory factors in explaining OASGR and OAMSGR (the firm performance) in Taiwan's e-brokerage firms. The results imply that strategy has no effect on both financial indicators. Again, the insignificance of strategy types might be attributed to the financial indicator, and to using the one-year annual growth rate. One possible explanation is that strategy type not only affects online performance, but may have a greater influence on overall firm performance (instead only online performance) as e-brokerage firms in Taiwan are mostly hybrid companies. In addition, top managers' perceptions of intended or realized strategies might have resulted in differences in the study.

### *CEO Commitment to EC and Firm Performance*

The second explanatory variable of CEO commitment to EC was analyzed using hierarchical multiple regression to see its effect on firm performance. For both indicators of firm performance, CEO commitment to EC showed a positive and significant correlation with OASGR ( $r = .167, p < .018$ ) and OAMSGR ( $r = .156, p < .026$ ). This result reflected that the higher the CEO commitment to EC, the higher the firm performance of Taiwan's e-brokers. The finding was consistent with the current literature (Kuo, 2003; Lee, 1999; Yang et al., 2002; Zhuang & Lederer, 2004). Generally, when B2C EC firms have a higher level of CEO commitment to EC, more firm resources are invested in EC and thus contribute to firm performance.

In contrast, CEO commitment to EC was an insignificant explanatory factor in the regression model for both OASGR and OAMSGR. The findings were inconsistent with Zhuang and Lederer (2004). The reason for the inconsistency may be caused by a time

lag between when top managers commit firm resources (human and funding resources) to EC and the long time it takes to see their effect. In this study, only one year's annual online sales and market share growth rate was used as a base for analysis. Therefore, a longer time frame is needed for CEO commitment to EC to be an effective factor in influencing online sales and market share. In addition, top managers' perceptions of CEO commitment to EC might be biased (differences between perception and actual).

### ***Website Design Capabilities and Firm Performance***

In this study, website design capabilities included five sub-constructs (dimensions) and they were analyzed to see their impact on OASGR and OAMSGR (firm performance). The five sub-constructs were publishing, catalog, and transaction applications, interface, and interactivity and server performance. Only catalog application had a positive and significant association with OASGR ( $r = .167, p < .018$ ) and OAMSGR ( $r = .178, p < .012$ ). In addition, the  $\beta$  weight of catalog application had a significant and positive contribution to the regression model ( $\beta = .327, p < .013$  for OASGR,  $\beta = .273, p < .023$  for OAMSGR). This finding was supported by the current literature (Auger, 2005; Lee & Kim, 2002; Ranganathan & Grandon, 2002; Zhuang & Lederer, 2004). This finding showed that increases in catalog application (providing information about products and services), was an important factor in enhancing firm performance of e-brokers in Taiwan. Customers may perceive that added value is provided by giving them information and revealing new products and services online. As stated by Oetzel (2004), value creation is based on the Internet's ability to add value to online shoppers, through online trading, new products and services, and information.

The other four website design capabilities, transaction, interface, interactivity and server performance, and publishing application, were found to be insignificant in explaining OASGR and OAMSGR. The results lead to the belief that building and updating website design capabilities (except catalog application) cannot increase firm performance. The findings of this study were inconsistent with studies conducted by Auger (2005), Lee and Kim (2002), and Zhuang and Lederer (2004). Researchers have found that EC has no influence on financial performance (Epstein, 2004; Kamssu, Reithel, & Zieglmayer, 2003; Motiwalla et al., 2005; Wang et al., 2002). The reason for the inconsistency may due to rapid changes in the virtual world. Dynamic changes in EC have made online retailers struggle with the question of how to generate revenues (Wang et al., 2002). In addition, e-brokerage firm website design features may be easily imitated by competitors.

One open-ended question was added which asks top managers to rate the original six sub-constructs of website design capabilities from the most important to the least important. The results showed that interactivity was the most important dimension, meaning that top managers perceived that a user-friendly website with fast responses to customers was the most important factor. This implies that a website needs to be able to not only meet customers' requests (needs), but also to be efficient (fast) in order to succeed. In addition, transaction application was rated the second most important factor, signifying that top managers believed that providing secure online orders and order tracking were important to customers. In contrast, publishing application was perceived by top managers to be the least important factor, meaning that providing company policy and information were not as important to customers. Findings from this open-ended

question were inconsistent with the findings related to the relationship between website design capabilities (5-point scale) and firm performance, which indicated that catalog application was the only significant contributor to firm performance. The gap between top managers' perceptions and the actual results seen in firm performance indicate a need for top managers to reconsider and readjust their priority of website design capabilities in order to expand firm performance.

### ***IT System Integration Capability and Firm Performance***

IT system integration capability measured how different information systems are coordinated to allow online information sharing and transaction execution in the value chain. This explanatory variable was used as a factor to see how it affected firm performance. As IT system integration had no influence in OASGR, this finding contradicted current literature (Ravichandran & Lertwongsatien, 2005; Saeed et al., 2005). However, IT system integration contributed significantly and negatively to OAMSGR ( $\beta = -.356, p < .006$ ). This result also contradicted previous empirical studies (Ravichandran & Lertwongsatien, 2005; Saeed et al., 2005) that demonstrated higher IT system integration leads to higher efficiency which results in better firm performance. Again, the inconsistency might be attributed to the financial indicator, as using only a one-year annual growth rate. Top managers' perceptions might be biased (overestimating their IT system integration). In addition, IT system integration might affect more than online performance. It may in fact affect overall performance.

This section provided an interpretation for each variable's impact on firm performance. No significant differences were found between strategy types in OASGR and OAMSGR. Additionally, most variables examined in this study had no significant



impact on OASGR and OAMSGR except catalog application. Table 5-1 provides a summary of the research purpose, hypotheses tested, and the results of this study.

Table 5-1

*Research Purpose, Hypotheses, and Results*

Research Purpose	Hypotheses	Results
1. To investigate if different strategy types resulted in different level of firm performance	1. Taiwanese e-broker firms whose top managers report using prospector, analyzer, and defender type strategies have significantly higher online sales than Taiwanese e-broker firms whose top managers report using reactor strategies.	Not Supported
	2. Taiwanese e-broker firms whose top managers report using prospector, analyzer, and defender type strategies have significantly higher online market share than Taiwanese e-broker firms whose top managers report using reactor strategies.	Not Supported
	3. Taiwanese e-broker firms whose top managers report using prospector type strategies have significantly higher online sales than Taiwanese e-broker firms whose top managers report using analyzer, defender, and reactor strategies.	Not Supported
	4. Taiwanese e-broker firms whose top managers report using prospector type strategies have a significantly higher online market share than Taiwanese e-broker firms whose top managers report using analyzer, defender, and reactor strategies.	Not Supported
2. To examine the influence of CEO commitment to EC, strategy types, website design, and IT system integration capabilities on the performance of Taiwan's e-brokerage firm	5. There is a significant positive relationship between Taiwanese top manager's perceptions of CEO commitment to EC, strategy types, website design, IT system integration capabilities, firm size, web age, characteristics of top managers, and online sales in Taiwan's e-brokerage firms.	Mixed, generally not Supported
	6. There is a significant positive relationship between Taiwanese top manager's perceptions of CEO commitment to EC, strategy types, website design, IT system integration capabilities, firm size, web age, characteristics of top managers, and online market share in Taiwan's e-brokerage firms.	Mixed, generally not Supported

### **Practical Implications**

Findings in this study have some implications for B2C EC practice. In particular, e-brokerage firms that want to improve their firm's performance should invest their resources in their core capabilities (competencies). For instance, catalog application (website design capability) is a way of effectively using of internal information sharing and how this information is used (or analyzed) and applied by employees to constantly provide useful communication on new products and services for their customers. This is considered a way of creating added value for customers who can compare multiple products, view product contents easily, and provide products that fit customers' needs. This can be an invaluable core competency for e-brokerage firms to retain customers by staying with the same website. The continuous improvement and strengthening of core capabilities are most likely to provide sustainable competitive advantages that have a positive effect on firm performance (Porter, 2001). According to the findings in this study, implications for practice are as follows:

1. The organizational characteristic of web age contributed negatively and significantly to OASGR and OAMSGR. Web age (indicated by how long a company had the online business) can also be seen as the early mover with a long history of being on the Internet. The early movers into the virtual world can no longer enjoy online first-mover advantage. Thus, firms with online businesses should focus on strengthening their core capabilities.
2. CEO commitment to EC is important in determining both online sales and market share (correlation). When the level of CEO commitment to EC is

higher, online sales and market share (firm performance) are increased. As e-brokerage firms allocate more tangible (financial) and intangible resources (human resources and support from top managers) into EC related capabilities with the full support of top managers, companies are likely to enjoy better performance.

3. Findings indicated that catalog capability (core capability) of website design is a significant factor affecting online sales and market share. Catalog application capability requires the website to offer customers products and services information. The ability to allow customers to compare multiple products, view product contents easily, and provide products that fit customers' needs, all at the same time, is critical to retain customers staying with the same website. Thus, e-brokerage firms should put more effort into working on meeting customers' needs in products and services (value creation) in order to gain positive results in firm performance.
4. Top managers in e-brokerage firms perceived that interactivity and transaction application were the most important site features in building website design capabilities. However, the results of this study suggested that the catalog application capability of website design was the only factor that contributed positively and significantly to both online sales and market share. As a result, top managers should adjust their perception and redirect their effort in building and strengthening catalog application capability instead of interactivity and transaction application.

5. Overall, firm performance of OASGR and OAMSGR is a function of website age (one of the organizational characteristics), CEO commitment to EC, catalog application (one of the website design capabilities) and IT system integration capabilities. Therefore, top managers have to effectively focus on all those areas at the same time in order to beat the competition in the market they are in. Doing well in only one area is not enough to compete in the B2C EC world.

### **Conclusions**

Variations in firm performance are attributed to organizational effect (firm specific) and industry effect (external environment) (Rumelt, 1991). In addition, the financial model proposed that firm performance is determined by the goal of the firm (usually profit oriented), resource allocation, and the external environment. Thus, this study combined the resource-based view to explain firm specific effect (firm resources and capabilities) and Miles and Snow's (1978) strategic typology as the industry effect to respond to the external environment. Guided by these two theories and the current empirical literature, strategy types, CEO commitment to EC (firm resources), and website design and IT system integration capabilities were integrated to explain firm performance in Taiwan's e-brokerage sector. Based on the findings in this study, the following conclusions are presented:

1. Organizational characteristics of web age made significant and negative contributions to OASGR and OAMSGR. Web age was measured by the length of time the firm operated an online business. The longer the firm operated online, the lower the firm performance, indicating that e-

brokerage firms can no longer rely on first-mover advantage due to dynamic changes in the virtual world.

2. Prospector, defender, analyzer, and reactor strategies showed no difference in affecting the level of firm performance in Taiwan's e-brokerage sector.
3. Website design capabilities initially had six dimensions. However, according to the data collected from the e-brokerage sector in Taiwan, the two dimensions of interactivity and server performance can be merged into one dimension to explain firm performance
4. Top managers in e-brokerage firms perceived that interactivity and transaction application were the most important site features in building website design capabilities (according to the importance rating). However, the results of this study showed that the catalog application capability of website design was the only factor that contributed positively and significantly to the two regression models (online sales and market shares). This indicated that providing information about services and products that meet customers' need through the Internet is critical. As a result, top managers should adjust their perception and redirect their effort to building and strengthening catalog application capability in particular.
5. This study was the first to integrate strategy types with resources (CEO commitment to EC) and capabilities (website design and IT system integration), in addition to the two variables of firm size and web age, to explain firm performance. The results of the regression models indicated

that online sales and market shares were not significantly explained by these factors (adjusted  $R^2 = .12$ ).

6. The variance of online annual sales growth rate was only marginally explained by managers' tenure, catalog application (website design), and CEO commitment to EC (adjusted  $R^2 = .12$ ).
7. The non-significant findings of some of the factors investigated in this study may be due to the fact that those factors might have greater impact on overall performance instead of online performance of Taiwan's e-brokerage firms.

### **Limitations**

No study is without its limitations. Therefore, this study has the following limitations:

1. The design of this study was non-experimental which weakened internal validity.
2. The data collection method of using phone calls might cause researcher bias from contact with participants, and this may weaken internal validity.
3. The final self-selected sample may introduce sampling bias, threatening external validity.
4. Due to the limitations of cost and time, the study applied a cross-sectional, "one-time survey," whereas a longitudinal approach might be better for a study examining firm performance.

5. The findings in this study cannot be generalized to other e-business sectors beyond e-brokerage firms, due to the different characteristics inherent to the nature of each sector.
6. Specific online firm performance in e-brokerage firms was difficult to obtain beyond online sales and market share in Taiwan. As a result, perceptual indicators such as unique visitors to the site, average site traffic, and conversion rate could not be tested in this study.
7. Top managers were the only participants from Taiwan's e-brokers. Their perceptions of strategy types, CEO commitment to EC, and website design and IT system integration capabilities may not be representative of e-brokers.

### **Recommendations for Future Study**

Recommendations for future study are intended to extend the body of this study. In addition, recommendations can provide possible directions for researchers who are interested in the same field. Recommendations made by the researcher are listed as follows:

1. This study was based on top managers' perceptions. Their perceptions might be biased in favor of their company. Thus, future study should consider using customers' perspectives.
2. A study using customer perception should be considered as a follow-up to this study as it might be able to link customer loyalty to firm performance.
3. Online sales and online market annual growth rates were calculated for one year only, which might be the reason why the explanatory factors in this

study had a low adjusted  $R^2$ . Thus, a longitudinal study of three to five years should be undertaken in the future.

4. EC factors (strategy, CEO commitment, and website design capabilities including interface, interactivity and server, transaction, publishing applications) examined in this study may have greater influence on overall firm performance instead of online sales and online market share. Therefore, it might be better to use overall sales, market share, and other financial indicators to examine e-brokerage firms since most companies are hybrid, integrating physical stores and online websites.
5. Additional perceptual indicators of EC performance such as average site traffic, unique site visitors, and conversion rate, should be added together with financial indicators to better measure firm performance.
6. The IT system integration capability measure developed by the researcher is a one-item instrument, which can be expanded and needs to be validated in the future.
7. Data analysis of MANOVA can also be conducted for this study, since this study contained multiple independent variables and two dependent variables.
8. Different methods of data analyses, such as structural equation modeling (SEM), should be conducted to examine mediating factors such as strategy type or CEO commitment to EC to see how they affect website design and IT system integration capabilities as well as firm performance.



9. Interactions (covariance) among strategy type, CEO commitment to EC, and website design and IT system integration capabilities on firm performance should be investigated.
10. Other influential factors such as knowledge management and other core competency factors (how they utilize core competencies and how to apply them) might be better factors in explaining firm performance.
11. A qualitative study is needed to better understand how core competencies or capabilities (website design and IT system integration) are utilized. The process of how e-brokerage firms utilize their information sharing throughout the value chain might be an influential mediating factor on firm performance. For example, the process of information sharing and how its effective use by employees, or partners of supply chains, adds value for customers and firm performance should be analyzed.
12. A cross-country comparison of the e-brokerage sector can be conducted to see how different factors affect firm performance in different countries.

The findings of this study concluded that strategies showed no differences and had no influence on firm performance. In addition, only website design of catalog application (for both regression models) is significantly positive, and IT system integration capability and web age are significant negative explanatory variables of OASGR and OAMSGR. Hopefully, the findings of this study contribute to the understanding of B2C EC firm performance and provide practical insights for top managers to use to gain sustainable competitive advantages in pursuit of superior

performance. In addition, the results of this study may also be applied to the fields of strategic management and marketing.

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## **Appendix A**

### **IRB Approval**



Lynn University

**Principal Investigator:** May-Ching Ding

**Project Title:** Impact of Business-to-Consumer Electronic Commerce on Firm Performance in Taiwan's e-brokerage Sector

**IRB Project Number** 2006-034

Application and Protocol for Review of Research Involving Human Subjects of a New Project:

Request for Exempt Status ☐ Expedited Review ☐ Convened Full-Board ☒

**IRB ACTION by the CONVENED FULL BOARD:**

Date of IRB Review of Application and Research Protocol: 09/13/06

IRB ACTION: Approved ☒ Approved w/provision(s) ☐ Not Approved ☐ Other ☐

**COMMENTS:**

Consent Required: No ☐ Yes ☒ Not Applicable ☐ Written ☒ Other ☐

Consent forms must bear the research protocol expiration date of 09/13/07

Application to Continue/Renew is due:

(1) For a Convened Full-Board Review, two months prior to the due date for renewal ☒

(2) For an Expedited IRB Review, one month prior to the due date for renewal ☐

(3) For review of research with exempt status, one month prior to the due date for renewal ☐

Name of IRB Chair (Print) Farideh Farazmand

Signature of IRB Chair

Date: 09/13/06

Cc. Dr. Francis

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## **Appendix B**

### **Authorization for Voluntary Consent (English Version)**



Lynn University

**THIS DOCUMENT SHALL ONLY BE USED TO PROVIDE AUTHORIZATION FOR  
VOLUNTARY CONSENT**

**PROJECT TITLE:** Impact of Business-to-Consumer Electronic Commerce on Firm Performance in Taiwan's e-Brokerage Sector

**Project IRB Number:** 2006-034 Lynn University 3601 N. Military Trail Boca Raton, Florida 33431

I May-Ching Ding, am a doctoral student at Lynn University. I am studying Global Leadership, with a specialization in Corporate and Organizational Management. Part of my degree requirements is to conduct a research study.

**DIRECTIONS FOR THE PARTICIPANT:**

You are being asked to participate in my research study. Please read this carefully. This form provides you with information about the study. The Principal Investigator (May-Ching Ding) will answer all of your questions. Ask questions about anything you don't understand before deciding whether or not to participate. You are free to ask questions at any time before, during, or after your participation in this study. Your participation is entirely voluntary and you can refuse to participate without penalty or loss of benefits to which you are otherwise entitled.

**PURPOSE OF THIS RESEARCH STUDY:** The study is about the impact of business-to-consumer electronic commerce on firm performance in Taiwan's e-brokerage sector. You acknowledge that you are at least 18 years of age, and that you do not have medical problems or language or educational barriers that precludes understanding of the explanations contained in this authorization for voluntary consent. There will be approximately 440 people invited to participate in this study. Participants are top managers who are one and two levels down from the chief executive officers and work in e-brokerage firms that report to Taiwan Stock Exchange.

**PROCEDURES:**

If you agree to participate after reading this consent form you may proceed to answer the survey provided in this package. You will complete a survey that contains six parts with a total of 33 items. The survey should take no longer than 10 minutes to complete. After completion of the survey, you will send the survey back to the investigator by mail, using the self-address envelope with postage provided.

**POSSIBLE RISKS OR DISCOMFORT:** This study involves minimal risk. You may find that some of the questions are sensitive in nature. In addition, participation in this study requires a minimal amount of your time and effort.

**POSSIBLE BENEFITS:** There may be no direct benefit to you in participating in this study. But knowledge may be gained on firm performance in the field of B2C EC. Knowing the impact of B2C EC factors on financial performance can assist organizations to understand the "new economy" in one year.

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use EC to gain and sustain the competitive advantage that will allow organizations to reach a economic or market goal.

**FINANCIAL CONSIDERATIONS:** There is no financial compensation for your participation in this research. There are no costs to you as a result of your participation in this study.

#### **ANONYMITY**

The survey will be anonymous (no names, no social security numbers, no driver's license numbers, etc.). You will not be identified and data will be reported as "group" responses. Participation in this survey is voluntary and return of the completed survey will constitute your informed consent to participate. Any disclosure will be made in accordance with the State and Federal law.

**RIGHT TO WITHDRAW:** You are free to choose whether or not to participate in this study. There will be no penalty or loss of benefits to which you are otherwise entitled if you choose not to participate.

**CONTACTS FOR QUESTIONS/ACCESS TO CONSENT FORM:** Any further questions you have about this study or your participation in it, either now or any time in the future, will be answered by May-Ching Ding who may be reached at [REDACTED] and Dr. Jeanette Francis, faculty advisor who may be reached at [REDACTED]. For any questions regarding your rights as a research subject, you may call Dr. Farideh Farazmand, Chair of the Lynn University Institutional Review Board for the Protection of Human Subjects, at [REDACTED]. If any problems arise as a result of your participation in this study, please call the Principal Investigator May-Ching Ding and the faculty advisor (Dr. Jeanette Francis) immediately. A copy of this consent form will be given to you.

**INVESTIGATOR'S AFFIDAVIT:** I have carefully explained to the subject the nature of the above project. The person participating has represented to me that he/she is at least 18 years of age, and that he/she does not have a medical problem or language or educational barrier that precludes his/her understanding of my explanation.

\_\_\_\_\_  
Signature of Investigator

Date of IRB Approval: 09/17/06 7-7



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## **Appendix C**

### **Authorization for Voluntary Consent (Chinese Version)**



Lynn University

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VOLUNTARY CONSENT

本文僅授權個人意願予問卷調查使用

論文題目: 電子商務因素對台灣電子券商績效之影響

論文 IRB 編號: 2006-034 Lynn University 3601 N. Military Trail Boca  
Raton, Florida 33431

丁美齡為林恩大學國際領導學系博士班學生，主修企業組織管理。論文研究是完成博士學位的要求之一，以下為我的博士研究問卷：

#### 受訪者之說明

謝謝你同意填寫此份研究問卷。請仔細閱讀以下關於此份問卷的說明。在決定是否參與此問卷前，歡迎您詢問任何問題。並且，在您填寫問卷前，填寫問卷時或填寫問卷後，如有任何問題，歡迎隨時提出。研究生丁美齡將誠懇回答您所有的問題。在此聲明，您的參與完全出於自願，所以您可以隨時終止填寫問卷，終止填寫問卷並不會受到任何的處罰或失去任何利益。

研究目的：此研究為關於電子商務因素對台灣電子券商績效影響之分析。您，研究參與者(受訪者)必需年滿 18 歲，您並無醫療與教育上的問題，因此能了解本研究為自願性行為。約 440 人受邀參與此項研究。受訪者為高階主管，任職於電子券商。此研究所指電子券商，皆為根據於台灣證券交易所。

填寫步驟：經您的同意參與此研究，請您詳細閱讀同意願書之後，請您填寫郵件所附上的問卷一份。問卷分為六頁部份，共有 33 道題。完成此問卷需時約 10 分鐘，完成問卷後，請您密封於回郵信封寄回。

潛在危險或不適：此研究的危險性極小，您可能會覺有些問題較為敏感，但不需要您些許寶貴的時間和精力。



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潛在利益：您的參與或許沒有直接的利益，但您寶貴的意見可幫助電子商務提升財務績效，並了「新經濟」電子商務對企業的影響，改善企業經營方式與平競爭優勢，進而協助企業達成企業經濟的或市場的目標。

財務之報償：參與此研究並無任何財務上的報償，亦無需自付任何費用。

匿名：此問卷採匿名方式進行（不包含填寫人姓名，或個人身分證明之資料）。所有的數據都將用「團隊」的名義來呈現。填寫此份問卷為自願行為，交回此份問卷的同時，表示您同意參與此項研究計畫。任何公開的資訊將符合州與聯邦政府之法規。

退出此研究之權力：您可以自由的選擇參與或退出此研究。如果您選擇終止填寫問卷並不會受到任何的處罰或喪失任何利益。

關於此同意書：無論您現在或將來的任何時刻有任何問題，研究生丁美靜將竭誠為您解答。如有任何問題請與 [redacted] 或 [redacted] 或與我的指導教授，Dr. Jeanette Francis 聯絡。電話為 [redacted]。如有任何關於您權利的問題，請聯絡教授 Dr. Farideh Tarazmand，[redacted]。如在填寫問卷期間有任何的問題，請立即聯絡研究生丁美靜和指導教授 Dr. Jeanette Francis。在您填寫問卷同時，將會給您一份副本的同意書。

研究生之宣誓書：我在此保證，已將研究計畫謹慎周詳的為受訪者解釋，受訪者皆滿 18 歲並且沒有任何醫療上的問題，語言上的隔閡，或教育上的障礙，對我的解釋完全理解。我在此保證，我已盡最大力量使受訪者了解此項研究的稱謂、要求、利益和風險。

研究主筆簽名

IRB 核准日期：

09/13/06

7-1



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## **Appendix D**

### **Certification of Chinese Translation (Authorization for Voluntary Consent)**

**AFFIDAVIT**

I, LISA YU, SWEAR THAT I AM FLUENT WITH BOTH THE Chinese  
AND English LANGUAGES AND FURTHER SWEAR THAT THE  
ATTACHED TRANSLATION IS TRUE AND CORRECT TO THE ORIGINAL  
TO THE BEST OF MY KNOWLEDGE.

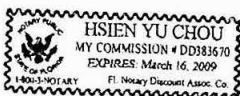
Lisa Yu  
LISA YU  
TRANSLATOR

STATE OF FLORIDA )

COUNTY OF DADE )

SWORN AND SUBSCRIBED BEFORE ME THIS \_\_\_\_\_

MY COMMISSION EXPIRES:



## **Appendix E**

### **Survey Instrument (English Version)**

### *Part 1: Organizational Characteristics*

- 
- 
1. **Firm Size:** Number of employees \_\_\_\_\_
  2. **Web Age:** Years operating online \_\_\_\_\_
- 

### *Part 2: Top Managers' Profile*

1. **Gender:** \_\_\_\_\_
  2. **Age:** \_\_\_\_\_
  3. **Education level:** \_\_\_\_\_
  4. **Manager Tenure:** In years \_\_\_\_\_
- 

### *Part 3: Measure of Strategic Type*

**INSTRUCTIONS:** Which one of the following descriptions most closely fits your organization compared to other firms in the industry? (Please consider your division or company as a whole and note that none of the types listed below is inherently “good” or “bad.”)

Note. From the Strategic Typology Survey by Snow, C. C. & Hrebiniak, L. G. , 1980. Adapted with permission of the author.

---

**Type 1**

☐

This firm operates within a broad product-market domain that undergoes periodic redefinition; the firm values being “first in” new product and market areas even if not all of these efforts prove highly profitable. The firm responds rapidly to early signals concerning areas of opportunity, and these responses often lead to a new round of competitive actions. However, this type of firm may not maintain market strength in every area it enters.

---

**Type 2**

☐

The firm attempts to locate and maintain a secure niche in a relatively stable product area. The firm tends to offer a more limited range of products than its competitors, and tries to protect its domain by offering high quality, superior service, lower prices and so forth. Often, this type of firm is not at the forefront of developments in the industry – it tends to resist industry changes that have no direct influence on current areas of operations and concentrates instead on doing the best possible job in a limited area.

---

**Type 3**

☐

This firm attempts to maintain a stable, limited line of products, while moving quickly to follow more promising new developments in the industry. The firm is seldom “first in” with new products. However, by carefully monitoring the actions of major competitors in areas compatible with its stable product-market base, the firm can frequently be “second in” with a more cost-efficient product.

---

**Type 4**

☐

This firm does not appear to have a consistent product-market orientation. The firm is usually not as aggressive in maintaining established products and markets as some of its competitors, nor is it willing to take as many risks as other competitors. Rather, the firm responds in those areas where it is forced to by environmental pressures.

---

#### *Part 4: CEO Commitment to EC*

**INSTRUCTIONS:** The following items are 1 to 5 scales. 1 represents “strongly disagree”, and 5 represents “strongly agree.” Neutral is 3. Please choose one that you find appropriate. Note. From the CEO Commitment to EC Questionnaire by Powell, T. C. & Dent-Micallef, A., 1997 and Zhuang, Y. & Lederer, A. L., 2004. Adapted with permission of the author.

1. Our top executives have clearly indicated their commitment to EC  
☐ 1. Strongly disagree   ☐ 2. Disagree   ☐ 3. Neutral   ☐ 4. Agree   ☐ 5. Strongly agree
2. Our top executives have supported e-commerce within the company  
☐ 1. Strongly disagree   ☐ 2. Disagree   ☐ 3. Neutral   ☐ 4. Agree   ☐ 5. Strongly agree
3. Our top executives have shown that *EC* is important to the company  
☐ 1. Strongly disagree   ☐ 2. Disagree   ☐ 3. Neutral   ☐ 4. Agree   ☐ 5. Strongly agree

#### *Part 5: Measure of EC Site Features*

**INSTRUCTIONS:** The following items are 1 to 5 scales. 1 represents “strongly disagree”, and 5 represents “strongly agree.” Neutral is 3. Please choose one that you find appropriate. Note. From the EC Site Features by Zhuang, Y. & Lederer, A. L., 2004. Adapted with permission of the author.

##### **Interactivity**

1. Our website responds within 48 hours to email queries  
☐ 1. Strongly disagree   ☐ 2. Disagree   ☐ 3. Neutral   ☐ 4. Agree   ☐ 5. Strongly agree
2. Our website lets customers easily access a human to answer questions  
☐ 1. Strongly disagree   ☐ 2. Disagree   ☐ 3. Neutral   ☐ 4. Agree   ☐ 5. Strongly agree
3. Our website readily accepts orders worldwide  
☐ 1. Strongly disagree   ☐ 2. Disagree   ☐ 3. Neutral   ☐ 4. Agree   ☐ 5. Strongly agree

##### **Publishing applications**

1. Our website publishes clear answers to frequently asked questions  
☐ 1. Strongly disagree   ☐ 2. Disagree   ☐ 3. Neutral   ☐ 4. Agree   ☐ 5. Strongly agree
2. Our website publishes important company policies (i.e., on credit, privacy, or payment terms)  
☐ 1. Strongly disagree   ☐ 2. Disagree   ☐ 3. Neutral   ☐ 4. Agree   ☐ 5. Strongly agree
3. Our website publishes useful general company information (e.g., company history, background, phone number, and physical location)  
☐ 1. Strongly disagree   ☐ 2. Disagree   ☐ 3. Neutral   ☐ 4. Agree   ☐ 5. Strongly agree

##### **Catalog applications**

1. Our website allows customers to compare multiple products easily  
☐ 1. Strongly disagree   ☐ 2. Disagree   ☐ 3. Neutral   ☐ 4. Agree   ☐ 5. Strongly agree
2. Our website allows customers to search products contents easily  
☐ 1. Strongly disagree   ☐ 2. Disagree   ☐ 3. Neutral   ☐ 4. Agree   ☐ 5. Strongly agree



3. Our website returns answers to product searches that fit customer profiles well  
☐ 1. Strongly disagree ☐ 2. Disagree ☐ 3. Neutral ☐ 4. Agree ☐ 5. Strongly agree

### Transaction applications

1. Our website allows customers to complete their orders online easily  
☐ 1. Strongly disagree ☐ 2. Disagree ☐ 3. Neutral ☐ 4. Agree ☐ 5. Strongly agree
2. Our website allows customers to complete their orders online securely  
☐ 1. Strongly disagree ☐ 2. Disagree ☐ 3. Neutral ☐ 4. Agree ☐ 5. Strongly agree
3. Our website provides up to date order tracking for our customers  
☐ 1. Strongly disagree ☐ 2. Disagree ☐ 3. Neutral ☐ 4. Agree ☐ 5. Strongly agree

### Server performance

1. Our website generally loads quickly  
☐ 1. Strongly disagree ☐ 2. Disagree ☐ 3. Neutral ☐ 4. Agree ☐ 5. Strongly agree
2. Our website loads quickly during sudden, large volume surges  
☐ 1. Strongly disagree ☐ 2. Disagree ☐ 3. Neutral ☐ 4. Agree ☐ 5. Strongly agree
3. Our website infrequently crashes  
☐ 1. Strongly disagree ☐ 2. Disagree ☐ 3. Neutral ☐ 4. Agree ☐ 5. Strongly agree

### Interface

1. Our website provides rich product descriptions using multimedia  
☐ 1. Strongly disagree ☐ 2. Disagree ☐ 3. Neutral ☐ 4. Agree ☐ 5. Strongly agree
2. Our website is easy to navigate  
☐ 1. Strongly disagree ☐ 2. Disagree ☐ 3. Neutral ☐ 4. Agree ☐ 5. Strongly agree
3. Our website provides links to direct customers easily to related items  
☐ 1. Strongly disagree ☐ 2. Disagree ☐ 3. Neutral ☐ 4. Agree ☐ 5. Strongly agree

Please rank from 1-6 which design feature is the most important (6 representing the design feature of the greatest importance) when your company is designing an EC website.

Interactivity	_____	Interface	_____
Publishing application	_____	Server performance	_____
Transaction application	_____	Catalog application	_____

### Part 6: IT System Integration Capability

At this time, please choose the level that best represents the degree to which your company has integrated ERP, CRM, and SCM systems.

- ☐ 1. No integration at all ☐ 2. 1~15% integrated ☐ 3. 16~30% integrated ☐ 4. 31~50% integrated ☐ 5. 51~70% integrated ☐ 6. 71%~90% integrated ☐ 7. Completely integrated

**Thank You so Much!**

**Appendix F**  
**Survey Instrument (Chinese Version)**

### 第一部分： 公司組織特徵

公司規模： 員工人數 \_\_\_\_\_

1. 電子商務年資： 網路經營年數 \_\_\_\_\_

### 第二部份： 高階主管個人資料

1. 性別： \_\_\_\_\_

2. 年齡： \_\_\_\_\_

3. 教育程度： \_\_\_\_\_

4. 服務年資： 年數 \_\_\_\_\_

### 第三部份： 公司策略型態

說明： 同一產業，與其他公司比較下，請勾選一種策略型態，最足以描述您的公司。  
(請以部門或公司為考量單位。以下的策略型態的描述並無 “好” 或 “壞” 的區別)。  
註. 此策略型態的問卷採用 Snow, C. C. & Hrebiniak, L. G., 1980, 並已取得作者之同意使用。

#### 策略型態 1

☐

此型態公司經營於多樣化產品的市場，因市場變遷快速，該市場會經歷週期性的重新定義。此類型企業重於新產品開發與首先進入該市場之「先驅」者，並視此為首要策略，即使此策略行為無法帶來高獲利性。再者，此類型公司對市場機會的訊息能夠快速回應，這樣的回應通常會引發另一波的產業競爭行為。但是，此類型公司可能無法在已進入的每一項產品市場中維持它的市場優勢。

#### 策略型態 2

☐

此型態公司在相對穩定的產品市場中，嘗試去定位並維持穩固的市場利基。相較於其他的競爭者，公司僅提供有限的產品種類，而且藉由提供高品質、卓越的服務，及低價位策略之等等方法以保護公司本身的市場利基。此型態公司在產業發展中，往往不是產品的先驅者。該類型的公司，較常抗拒產業競爭變化，但因目前產業變化對公司的經營並無直接影響，於是該企業致力於將現有的策略(工作)做到最好，並僅限於部分產品範圍。

#### 策略型態 3

☐

此型態企業非但嘗試於維持穩定在有限的產品市場外，該企業同時企圖快速的跟隨在具有潛力的產品發展上。該公司鮮少為產品開發的「先驅者」。但是，藉由觀察主要競爭對手的動向，該企業通常為「第二」進入市場者，反而能提供更具有符合成本效益的產品。

#### 策略型態 4

☐

此型態公司似乎不具有一致性的產品市場導向。通常此型態公司不像其它競爭者一樣積極於產品及市場的維持，也無意願於參與具有風險的市場。於是，該公司在環境變化壓力的驅使下，才會採取回應的行為。

### 第四部份： 高階主管對電子商務的支持

說明： 以下的項目，有五個等級。 1 代表“非常不同意”， 5 代表“非常同意”及 3 代表“沒有意見”。 請選擇您認為最適合的一個選項。

註. 此問卷採用 Powell, T. C. & Dent-Micallef, A., 1997 and Zhuang, Y. & Lederer, A. L., 2004, 並已取得作者之同意使用。

1. 我們的高階主管很清楚的保證並表示他們對電子商務的支持  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意
2. 我們的高階主管在公司內部表達電子商務為首要的企業優勢  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意
3. 我們的高階主管展現出電子商務對公司的重要性  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意

### 第五部份：電子商務網站設計特性

說明：以下的項目，有五個等級。1 代表“非常不同意”，5 代表“非常同意”及 3 代表“沒有意見”。請選擇您認為最適合的一個選項。

註：此問卷採用 Zhuang, Y. & Lederer, A. L., 2004，並已取得作者之同意使用。

#### 網站與客戶之互動

1. 我們的網站會在 48 小時內回應客戶的電子郵件問題  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意
2. 我們的網站提供便利的服務管道，以方便客戶與客服人員溝通  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意
3. 我們的網站能夠接受來自世界各地的訂單  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意

#### 網站訊息提供之功能

1. 我們的網站清楚地刊載及提供客戶常見問題與解答  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意
2. 我們的網站提供重要的公司政策資訊。例如：信用上問題，隱私權和付款方式等  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意
3. 我們的網站上有刊載公司的基本資料。例如：公司歷史，背景，公司電話號碼及公司地址  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意

#### 網站商品目錄之功能

1. 我們的網站提供客戶線上多項商品比較之功能  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意
2. 我們的網站提供客戶便利的商品內容搜尋  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意
3. 我們網站的搜尋功能，能協助客戶找到適合的商品  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意

#### 網站交易之功能

1. 我們的網站能讓客戶輕易的完成線上交易  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意

2. 我們的網站能讓客戶安全的完成線上交易  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意

3. 我們的網站提供客戶最即時的商品訂購及追蹤訊息  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意

#### 網站資訊速率之功能

1. 一般來說, 我們的網站可以迅速下載所需資訊  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意

2. 在網路擁塞時, 我們的網站依然可以讓客戶迅速下載所需資訊  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意

3. 我們的網站不常斷線  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意

#### 網站界面之功能

1. 藉由多媒體的功能運用, 我們的網站能夠提供豐富的產品描述與介紹  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意

2. 我們的網站很容易導覽  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意

3. 我們的網站提供連結, 顧客可以輕易在網頁上連接至不同的選項  
☐ 1.非常不同意 ☐ 2.不同意 ☐ 3.沒有意見 ☐ 4.同意 ☐ 5.非常同意

當公司在設計電子商務網站時, 您認為哪一項為最重要的因素(評分為6), 請依序給予評分至最為不重要的因素(評分為1)

網站與客戶之互動 \_\_\_\_\_

網站交易之功能 \_\_\_\_\_

網站訊息提供之功能 \_\_\_\_\_

網站資訊速率之功能 \_\_\_\_\_

網站商品目錄之功能 \_\_\_\_\_

網站界面之功能 \_\_\_\_\_

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### 第六部份: 資訊系統的整合能力

您公司在整合企業資源系統(ERP), 客戶關係管理(CRM)及供應鏈管理(SCM)此三大資訊系統。請圈選一項最適於目前貴公司資訊系統整合的程度

- |                     |                     |
|---------------------|---------------------|
| 1. 系統完全沒有整合         | 2. 只有 1% 至 15% 的整合  |
| 3. 只有 16% 至 30% 的整合 | 4. 只有 31% 至 50% 的整合 |
| 5. 只有 51% 至 70% 的整合 | 6. 只有 71% 至 90% 的整合 |
| 7. 系統已完全整合          |                     |

---

多謝您的幫忙!

## **Appendix G**

### **Certification of Chinese Translation (Survey Instrument)**

AFFIDAVIT

I, LISA YU, SWEAR THAT I AM FLUENT WITH BOTH THE Chinese  
AND English LANGUAGES AND FURTHER SWEAR THAT THE  
ATTACHED TRANSLATION IS TRUE AND CORRECT TO THE ORIGINAL  
TO THE BEST OF MY KNOWLEDGE.

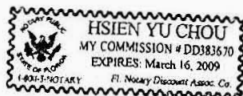
Lisa Yu  
LISA YU  
TRANSLATOR

STATE OF FLORIDA )

COUNTY OF DADE )

SWORN AND SUBSCRIBED BEFORE ME THIS \_\_\_\_\_

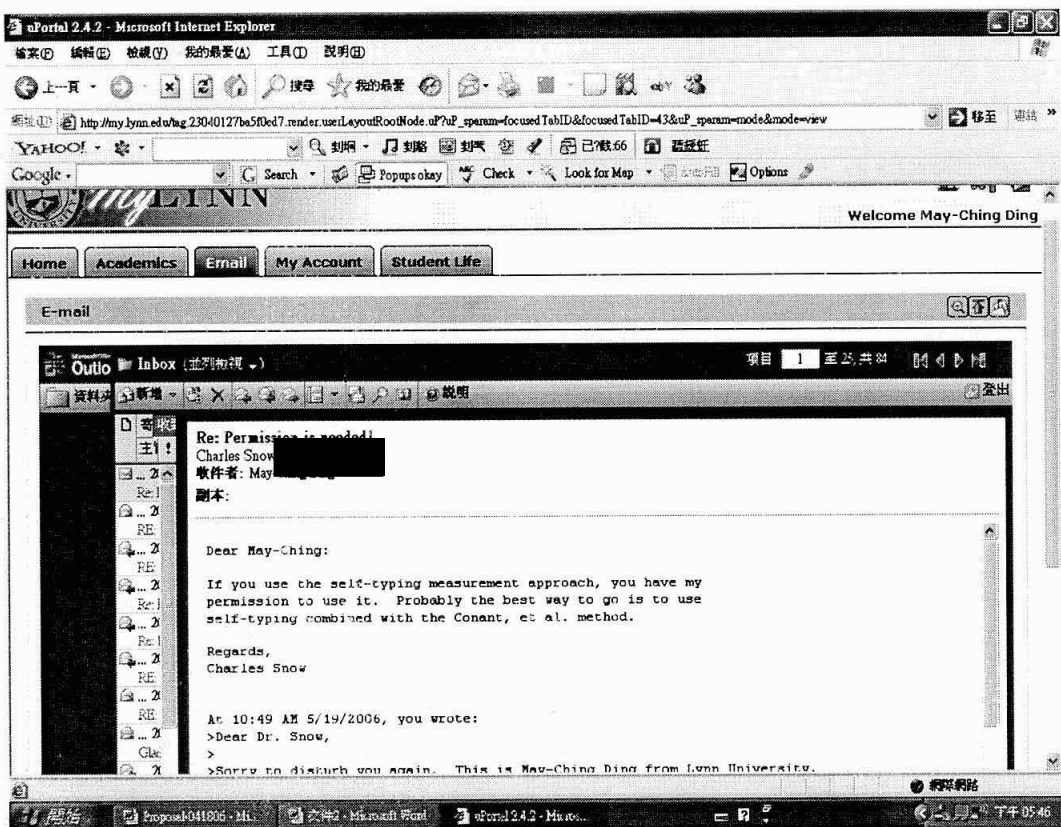
MY COMMISSION EXPIRES:



## **Appendix H**

### **Permission to Use the Strategic Typology Survey**





Dear May-Ching:

If you use the self-typing measurement approach, you have my permission to use it. Probably the best way to go is to use self-typing combined with the Conant, et al. method.

Regards,  
Charles Snow

Charles C. Snow  
Chair, Department of Management and Organization  
Smeal College of Business  
Penn State University  
452 Business Building  
University Park, PA 16802

Telephone: [REDACTED]  
E-mail: [REDACTED]  
Web page: <http://www.personal.psu.edu/ccs4>

At 10:33 PM 5/5/2006, you wrote:

>Hi Dr. Snow,

>

> It is an honor to write this email to you. My name is  
> May-Ching Ding. Currently, I am a PhD student in Lynn University

> located in Florida. I am working on my proposal, the impact of B2C  
> EC factors on firm performance. I have read your research on  
> strategic typology and felt that strategy type is one of the most  
> influential factors on B2C EC firm performance.

> With all respect, I am asking for your permission to use the  
> instrument that you developed to measure the four strategy types  
> (prospector, analyzer, defender, and reactor). One more thing to  
> ask for your help is that the Institutional Review Board (IRB) of  
> my school requests not only for your permission but also your  
> contact number and address as an approval that I do have your  
permission.

> Any suggestion and recommendation will be welcomed and  
> helpful. Thank you so much! Looking forward to hearing from you  
> soon! Have a Great day!

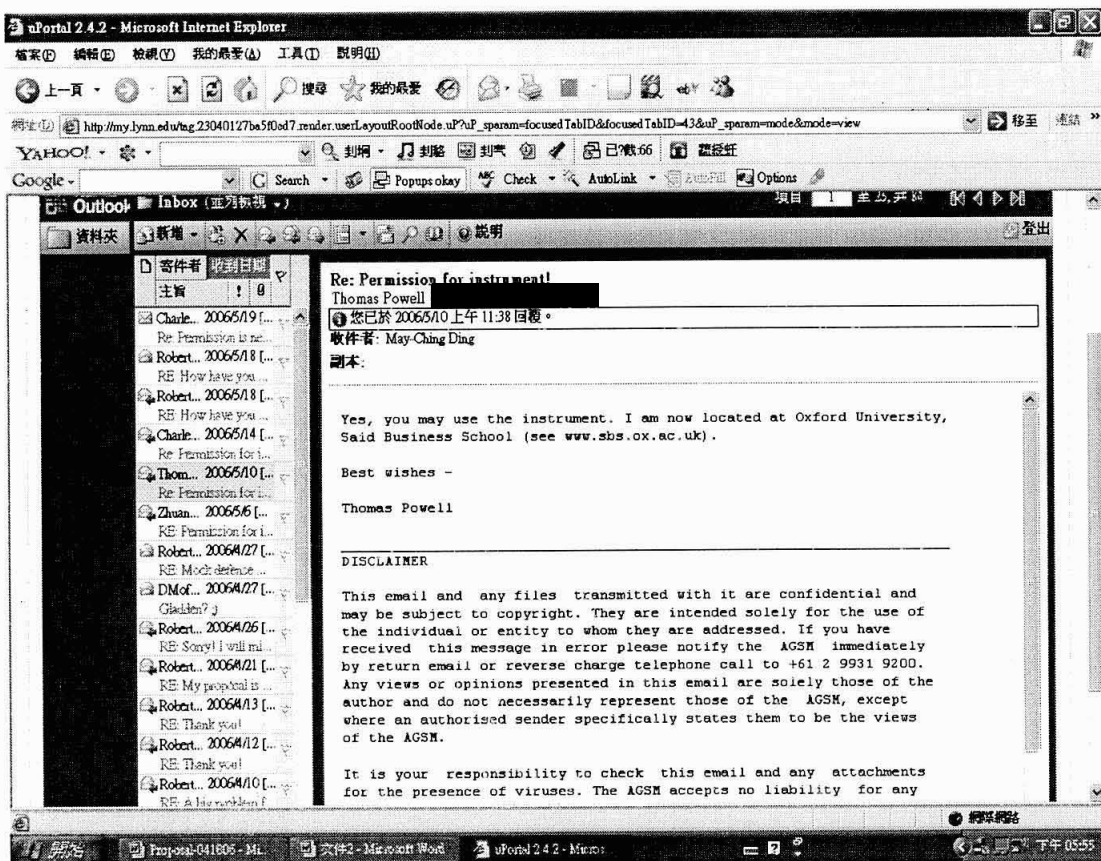
>

>Best Regards,

>May-Ching Ding (Vian)

## **Appendix I**

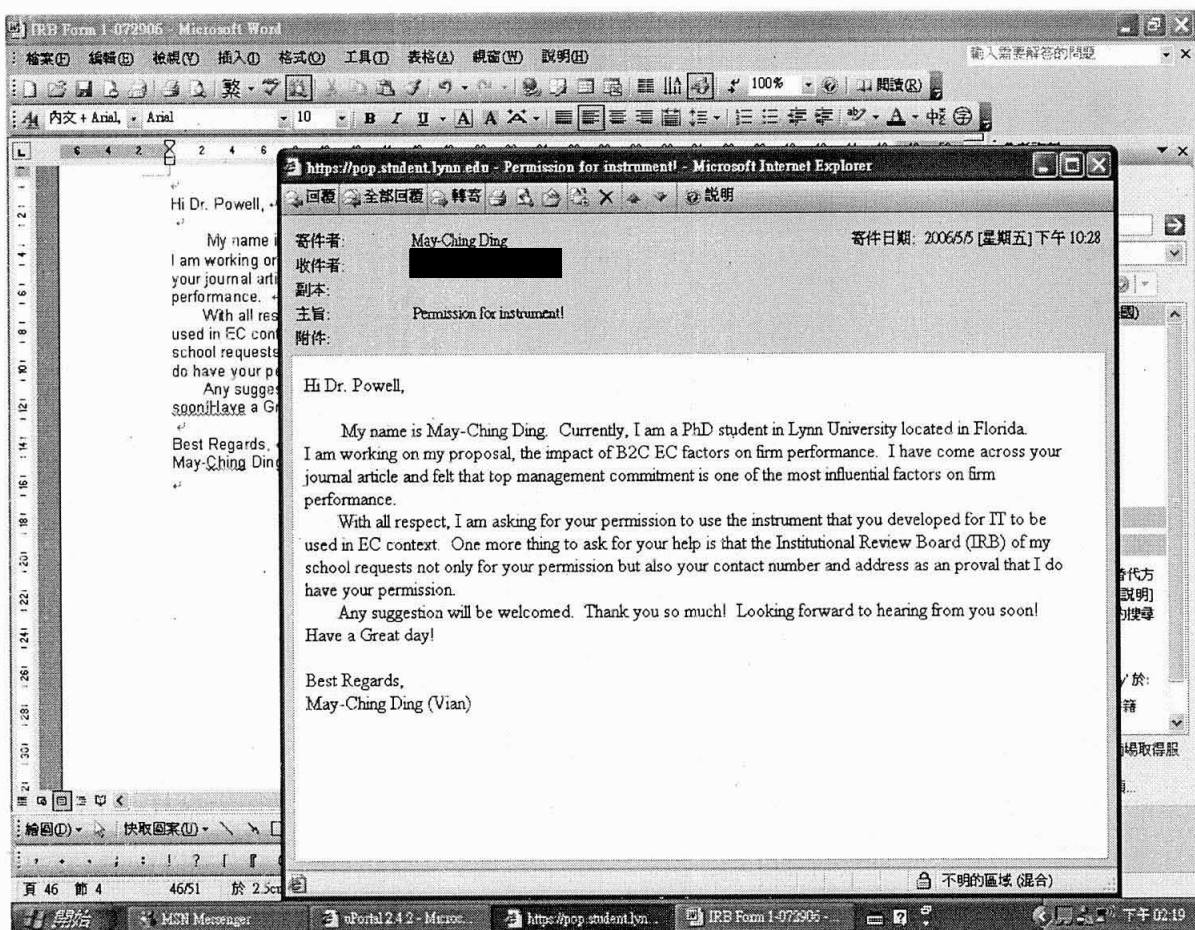
### **Permission to Use the CEO Commitment to EC Questionnaire**



Yes, you may use the instrument. I am now located at Oxford University, Said Business School (see [www.sbs.ox.ac.uk](http://www.sbs.ox.ac.uk)).

Best wishes -

Thomas Powell



Hi Dr. Powell,

My name is May-Ching Ding. Currently, I am a PhD student in Lynn University located in Florida. I am working on my proposal, the impact of B2C EC factors on firm performance. I have come across your journal article and felt that top management commitment is one of the most influential factors on firm performance.

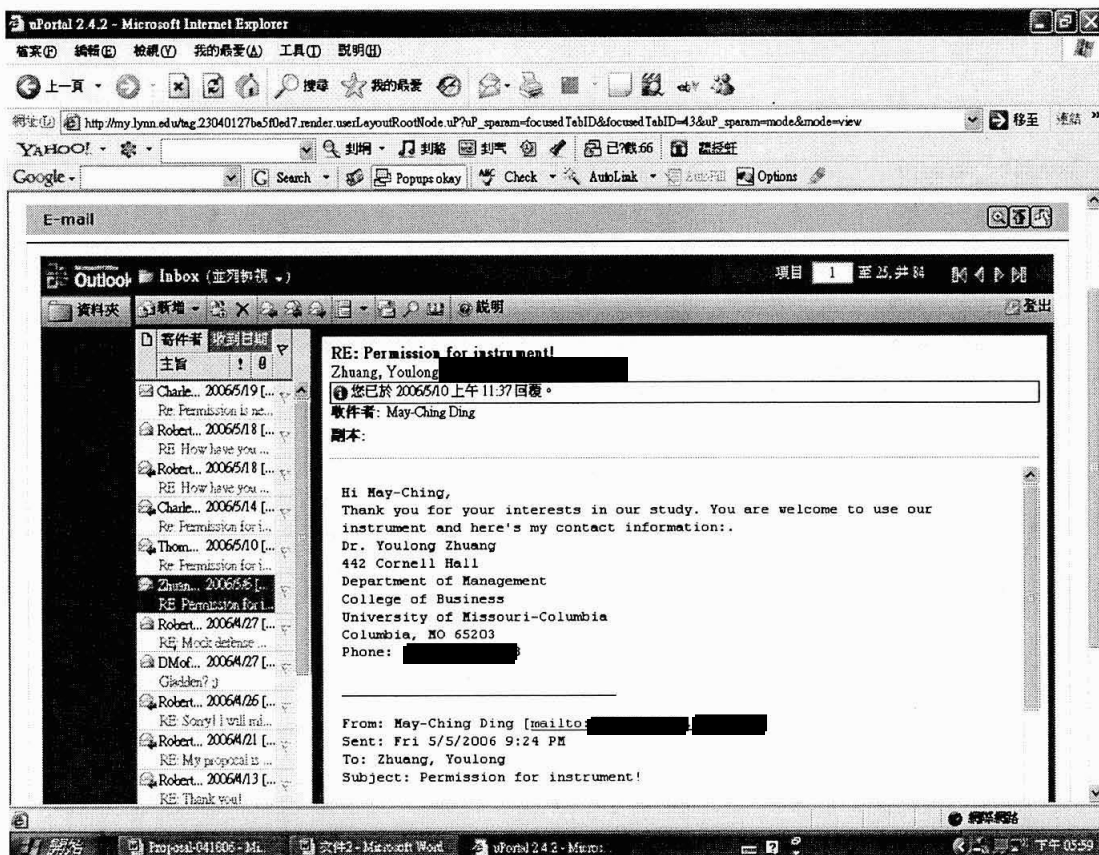
With all respect, I am asking for your permission to use the instrument that you developed for IT to be used in EC context. One more thing to ask for your help is that the Institutional Review Board (IRB) of my school requests not only for your permission but also your contact number and address as an approval that I do have your permission.

Any suggestion will be welcomed. Thank you so much! Looking forward to hearing from you soon! Have a Great day!

Best Regards,  
May-Ching Dang (Vian)

## **Appendix J**

### **Permission to Use CEO Commitment to EC and EC Site Features Survey**



Hi May-Ching,  
 Thank you for your interests in our study. You are welcome to use our  
 instrument and here's my contact information:.  
 Dr. Youlong Zhuang  
 442 Cornell Hall  
 Department of Management  
 College of Business  
 University of Missouri-Columbia  
 Columbia, MO 65203  
 Phone: [REDACTED]

From: May-Ching Ding [mailto:[REDACTED]]  
 Sent: Fri 5/5/2006 9:24 PM  
 To: Zhuang, Youlong  
 Subject: Permission for instrument!

Hi Dr. Zhuang,  
 My name is May-Ching Ding. Currently, I am a PhD student in  
 Lynn University located in Florida. With all respect, I am asking for  
 your permission to use the instrument that you developed for the study  
 of the impact of top management commitment, business process redesign,  
 and IT planning on the B2C EC site. Thank you so much!  
 Have a Great day!

Best Regards,  
 May-Ching Ding (Vian)

## **Appendix K**

### **Initial Telephone or Written Invitation Script and Follow Up Telephone Conversion**



### **Initial Telephone or Written Invitation Script**

Dear Mr. or Miss,

This is an inquiry phone call. My name is May-Ching Ding and I am a doctoral student at Lynn University in Florida, U. S. A. I am now researching on my dissertation for the doctoral degree. My research project is related to the impact of Business-to-Consumer Electronic Commerce factors on firm performance in Taiwan's e-brokerage sector.

I would like to ask for your help to participate in this study. This survey is only for the scholarly research purpose, and it would be anonymous. If you are interested in participating I would like to have your mailing address to send you the survey and informed consent. You can conduct the survey in your best convenient time. After you have completed the survey, just send the survey back using the return envelop which is self-addressed with postage provided. Your participation will be greatly appreciated. Thank you so much for your help!

If you have any question, please feel free to contact me at any time.

My phone: ( [REDACTED] ) 5161

E-mail: [REDACTED]

### **Follow Up Telephone Conversation**

Hi Mr. or Miss,

My name is May-Ching Ding. I called one or two weeks ago to invite you to participate in the study of the impact of Business-to-Consumer Electronic Commerce factors on firm performance in Taiwan's e-brokerage sector. I would like to remind you to complete and send the survey back to me if you haven't mailed it. If you did, I want to thank you sincerely for all your help.

If you have any question, please feel free to contact me at any time.

My phone: ( [REDACTED] )

E-mail: [REDACTED]

138C10 T 9781  
08/27/07 39800 \* 511 Group